

# Environmental Impacts of the Use of Orimulsion®

Report to Congress on Phase 1 of the Orimulsion® Technology Assessment Program

Volume 2: Appendices B-H

#### **Foreword**

The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the Agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. To meet this mandate, EPA's research program is providing data and technical support for solving environmental problems today and building a science knowledge base necessary to manage our ecological resources wisely, understand how pollutants affect our health, and prevent or reduce environmental risks in the future.

The National Risk Management Research Laboratory (NRMRL) is the Agency's center for investigation of technological and management approaches for preventing and reducing risks from pollution that threaten human health and the environment. The focus of the Laboratory's research program is on methods and their cost-effectiveness for prevention and control of pollution to air, land, water, and subsurface resources; protection of water quality in public water systems; remediation of contaminated sites, sediments and ground water; prevention and control of indoor air pollution; and restoration of ecosystems. NRMRL collaborates with both public and private sector partners to foster technologies that reduce the cost of compliance and to anticipate emerging problems. NRMRL's research provides solutions to environmental problems by: developing and promoting technologies that protect and improve the environment; advancing scientific and engineering information to support regulatory and policy decisions; and providing the technical support and information transfer to ensure implementation of environmental regulations and strategies at the national, state, and community levels.

This publication has been produced as part of the Laboratory's strategic long-term research plan. It is published and made available by EPA's Office of Research and Development to assist the user community and to link researchers with their clients.

E. Timothy Oppelt, Director National Risk Management Research Laboratory

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## Environmental Impacts of the Use of Orimulsion®

## Report to Congress on Phase 1 of the Orimulsion® Technology Assessment Program Volume 2. Appendices B-H

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#### **Abstract**

Orimulsion, a bitumen-in-water emulsion produced in Venezuela, was evaluated to provide a better understanding of the potential environmental impacts associated with its use as a fuel. A series of pilot-scale tests were conducted at the U.S. Environmental Protection Agency's Environmental Research Center in Research Triangle Park, NC, to provide data on emissions of air pollutants from the combustion of Orimulsion 100 (the original formulation), Orimulsion 400 (a new formulation introduced in 1998), and a No. 6 (residual) fuel oil. These results, and results of full-scale tests reported in the technical literature, were evaluated to determine the potential air pollutant emissions and the ability of commercially available pollution control technologies to adequately reduce those emissions. Emissions of carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), sulfur trioxide, particulate matter (PM), and organic and metal hazardous air pollutants (HAPs) were measured from each of these three fuels to provide a comparison between the "new" fuel (Orimulsion) and a fuel that has been commonly used in the U.S. (the No. 6 fuel oil). Results indicate that CO, NO<sub>x</sub>, and PM emissions are likely to be nearly the same as those from the No. 6 fuel oil, that SO<sub>2</sub> emissions can increase if the fuel sulfur content increases, that the particles generated by Orimulsion 100 and 400 are likely to be smaller in diameter than those generated by No. 6 fuel oil, and that HAPs are also likely to be similar to those from No. 6 fuel oil. Both the full-scale results found in the literature and the pilot-scale results measured at EPA indicate that conventional air pollution control technologies can effectively reduce emissions to very low levels, depending upon the type of technology used and the desired emission levels. Because the bitumen in Orimulsion is heavier than water and due to the presence of a surfactant in the fuel, spills of Orimulsion are likely to be more difficult to contain and recover than are spills of heavy fuel oil, especially in fresh water. Additional study is needed before adequate containment and response approaches can be developed. Little, if any, work has been conducted by the fuel producer or the scientific community to address the remaining spill-related issues.

#### **Preface**

This report is the result of a request by the U.S. Congress to receive scientific information regarding the potential environmental impacts of the use of Orimulsion as a fuel. In the second half of the 1990s, there was considerable interest on the part of electric utilities in using Orimulsion, which was promoted as a low-cost fuel that could replace heavy fuel oil or coal. There were also many concerns raised by the environmental community regarding the environmental impact associated with switching to Orimulsion. In 1997, the U.S. Congress requested that the U.S. Environmental Protection Agency (EPA) conduct a study to evaluate the potential environmental impacts associated with the use of Orimulsion. EPA's Office of Research and Development provided funds to the National Risk Management Research Laboratory (NRMRL) to conduct this study, and a team of EPA experts in air pollution control, spill response, health effects, and environmental assessment was assembled to carry out the investigation. This report was prepared by EPA staff using data generated at EPA facilities as well as data collected from the general literature.

In 1998, Bituménes Orinoco (Bitor), the manufacturer of Orimulsion, changed the formulation of the fuel. The original fuel, renamed Orimulsion 100, was replaced with a new formulation named Orimulsion 400. Compared to the amount of information on Orimulsion 100, there is relatively little data on the performance of Orimulsion 400. While this report provides as much data as possible on the emissions and performance of Orimulsion 400, the bulk of the data are for the older formulation (Orimulsion 100). Although Orimulsion 100 is no longer produced, the results presented here are still believed to adequately describe the basic behavior of both formulations of Orimulsion. The key question to be addressed in this study is, "Is Orimulsion significantly different from other fossil fuels, and if so, how?" The differences between Orimulsion 100 and Orimulsion 400, as indicated both from the available data and the information provided by the manufacturer, are substantially smaller than the differences between Orimulsion and other fossil fuels. The report distinguishes between the two formulations where appropriate, but uses the generic term "Orimulsion" where such distinction is either unimportant or misleading. The recent reformulation is significant with respect to the surfactant used (which will affect spill toxicity) and the use of a magnesium-based additive (which will affect boiler tube deposition and particulate matter emissions). Other environmental issues appear to be impacted only to a minor degree by the change in formulation.

The emphasis of this report is on generation and control of air pollutants from the combustion of Orimulsion. Although there are other environmental issues associated with the use of Orimulsion, particularly spills of the fuel into water, EPA and NRMRL were advised on several occasions that questions related to air pollutant generation and control were the key unknowns associated with understanding the environmental impact potential of Orimulsion. The initial step in EPA's research activities was the convening of a workshop to discuss environmental issues related to Orimulsion use. This workshop, held February 8, 1998, concluded that there was a lack of information on particle size distribution and composition and on emissions and control of sulfur trioxide from Orimulsion combustion. The workshop also concluded that enough data existed to allow a comparative risk analysis for heavy fuel oil and Orimulsion, and therefore additional research in that area was not immediately required. The workshop noted that a lack of data existed describing the behavior, fate, and effects of Orimulsion spills in fresh water. However, the workshop concluded that investigations into these areas should be the responsibility of Bitor in the event they sought to market the fuel to users where spills into fresh water were possible. Considerable work has been conducted to quantify behavior, fate, and effects of Orimulsion in saltwater environments under the oversight of the International Orimulsion Working Group, of which Bitor is a member and the major source of funding. Thus this report has as its focus the generation and control of air pollutants, although other topics are also covered.

This focus was emphasized in the Orimulsion Technology Assessment Plan that was prepared to guide EPA's research efforts. This plan was reviewed and approved, with modifying comments, by a

panel of technical experts, mostly from outside the federal government. The only exception was one member from the U.S. Coast Guard. The Plan was then reviewed by the Office of Management and Budget (OMB), the U.S. Department of Energy, and the Office of Science and Technology Policy. EPA responded to comments made by each of these organizations and revised the Plan, which was approved by OMB on April 22, 1999.

The National Risk Management Research Laboratory was the lead organization for the study, and was chiefly responsible for preparation of Chapters 1-5 and 9-12. Robert E. Hall was the overall program lead, and C. Andrew Miller was the lead author of these chapters. Kevin Dreher of the National Health and Environmental Effects Research Laboratory prepared Chapter 6, on toxicity testing, with substantial assistance from Adriana Crain. Chapter 7, on spills, was prepared with assistance from Royal J. Nadeau of EPA's Office of Solid Waste and Emergency Response. Randall Wentsel of the National Center for Environmental Assessment prepared Chapter 8, on environmental assessment.

The conclusions stated in this report are scientific conclusions, and are not intended to provide guidance relative to regulatory requirements that may or may not apply to the use of Orimulsion.

#### **Acknowledgments**

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Many of the reports from which full-scale data were taken were provided by Nelson Garcia Tavel of Bitor America, Jason Miles of Bitor Europe, and independent consultant Ken Olen.

#### **Nomenclature and Acronyms**

APCS ...... air pollution control system API ..... American Petroleum Institute

APPCD . . . . . . . . . Air Pollution Prevention and Control Division

ARD . . . . . . Arizona road dust

ASTM ..... American Society for Testing and Materials

BALF . . . . . . bronchoalveolar fluid bbl . . . . . . barrels, U.S. petroleum

BTEX . . . . . . benzene, toluene, ethylene, and xylenes

Btu ..... British thermal unit CAA ..... Clean Air Act

CO ... carbon monoxide
CO2 ... carbon dioxide
DAS ... data acquisition system
DQI ... data quality indicator
EDX ... energy dispersive x-ray

ESP ..... electrostatic precipitator

FETC ..... U.S. Department of Energy's Federal Energy Technology Center

FGD ..... flue gas desulfurization

FPL ..... Florida Power & Light Company GIS ..... geographical information systems

HAP . . . . . hazardous air pollutant HEPA . . . . high efficiency particulate air

HFO ..... heavy fuel oil HQ ..... health quotient

IOWG . . . . . International Orimulsion Working Group

IURE ..... inhalation unit risk estimate

LAPIO . . . . . low API oil

LOEC . . . . . lowest observable effects concentration

LOEL . . . . . lowest observed effect level

LOI ..... loss on ignition

MACS ..... miniature acid-condensation system

MDL ..... method detection limit

MEI . . . . . maximum exposed individual MIR . . . . maximum individual risk

NCEA . . . . . . . . . . National Center for Environmental Assessment

NHEERL ..... National Health and Environmental Effects Research Laboratory

NO ..... nitric oxide

NOEC . . . . . . . . . . no observable effects concentration

NO<sub>x</sub> ..... nitrogen oxides

NRC . . . . . . National Research Council

#### **Nomenclature and Acronyms (Continued)**

NRMRL ...... National Risk Management Research Laboratory

NSPS ..... New Source Performance Standard

 $O_2 \dots \dots oxygen$ 

OERR ..... Office of Emergency and Remedial Response

OFA ..... overfire air

ORD . . . . . Office of Research and Development

ORI 100 . . . . . Orimulsion 100 ORI 400 . . . . Orimulsion 400

OSWER ..... Office of Solid Waste and Emergency Response

OTAP . . . . . Orimulsion Technology Assessment Plan

PAH ..... polycyclic aromatic hydrocarbon

PBS ..... Package Boiler Simulator

PC ..... pulverized coal

PDVSA . . . . . . . Petroléos de Venezuela, S.A. PEA . . . . . . . . performance evaluation audit

PM ..... particulate matter

 $PM_{2.5}$  ...... particulate matter smaller than 2.5  $\mu m$  in aerodynamic diameter  $PM_{10}$  ...... particulate matter smaller than 10  $\mu m$  in aerodynamic diameter

ppm ..... parts per million QA ..... quality assurance

QAPP ..... quality assurance project plan

QC ..... quality control

ROFA 6 ..... residual oil fly ash (No. 6 fuel oil)

RSD ..... relative standard deviation

SASS ..... source assessment sampling system

SCR ... selective catalytic reduction
SEM ... scanning electron microscope
SMPS ... scanning mobility particle sizer
SNCR ... selective noncatalytic reduction

 $SO_2$  ...... sulfur dioxide  $SO_3$  ..... sulfur trioxide

SVOC . . . . . semivolatile organic compound

TCLP ..... toxicity characteristic leaching potential

THC ... total hydrocarbon
TSA ... technical systems audit
VOC ... volatile organic compound
VOST ... volatile organic sampling train
WLFO ... wet limestone forced oxidation

XRF ..... X-ray fluorescence

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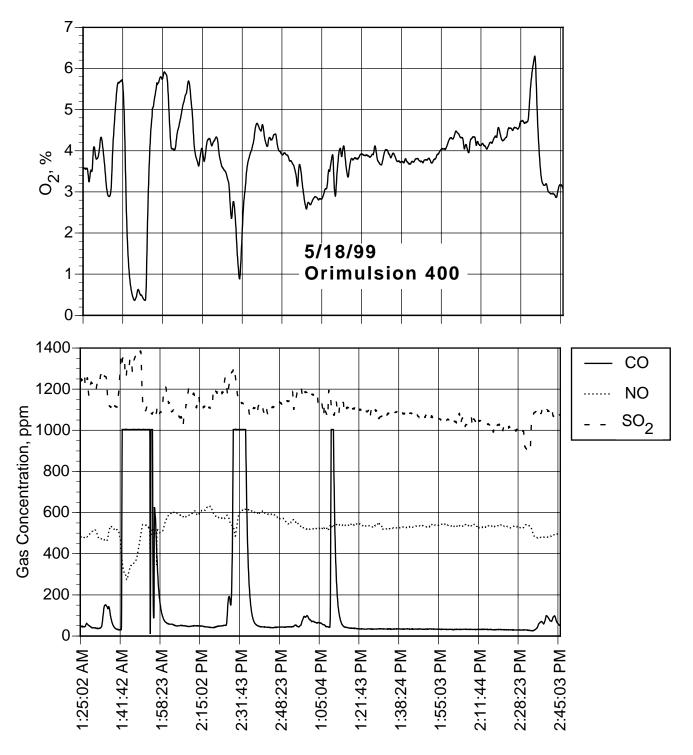
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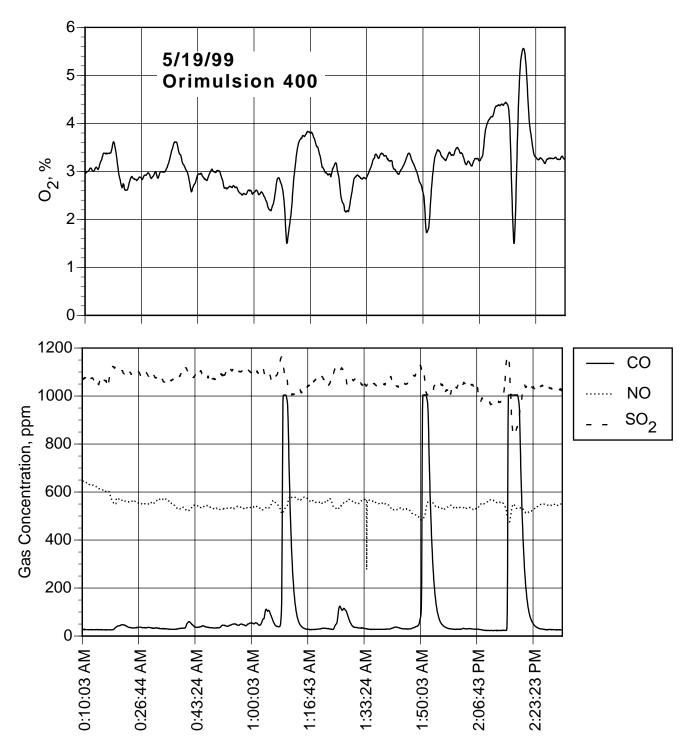
## **Appendix B Continuous Emission Monitoring Data for EPA Pilot-Scale Tests**

CEM data collected from each of the 12 test runs are presented below. Figures B-1 through B-12 present CO, NO,  $O_2$ , and  $SO_2$  concentrations (uncorrected) for each of the four test runs conducted for each of the three fuels. The top plot in each case shows  $O_2$  concentration, and the bottom plot shows CO, NO, and  $SO_2$ . The sampling personnel attempted to collect samples when  $O_2$  and CO fluctuations were minimal, and did not sample during periods when there were large fluctuations in conditions.

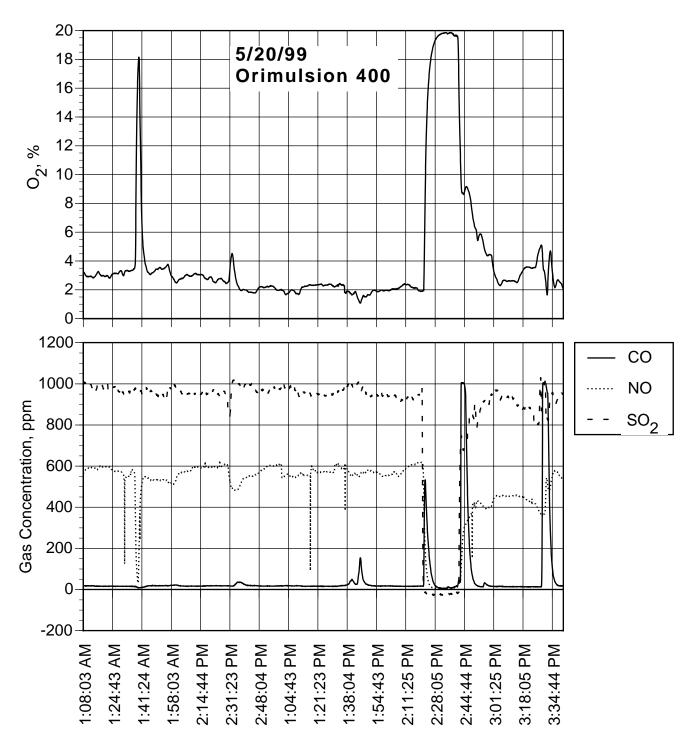
The plots are presented in chronological order, with Figures B-1 through B-4 showing results from tests of Orimulsion 400, Figures B5 through B-8 showing results from Orimulsion 100, and Figures B-9 through B-12 showing results from No. 6 fuel oil.



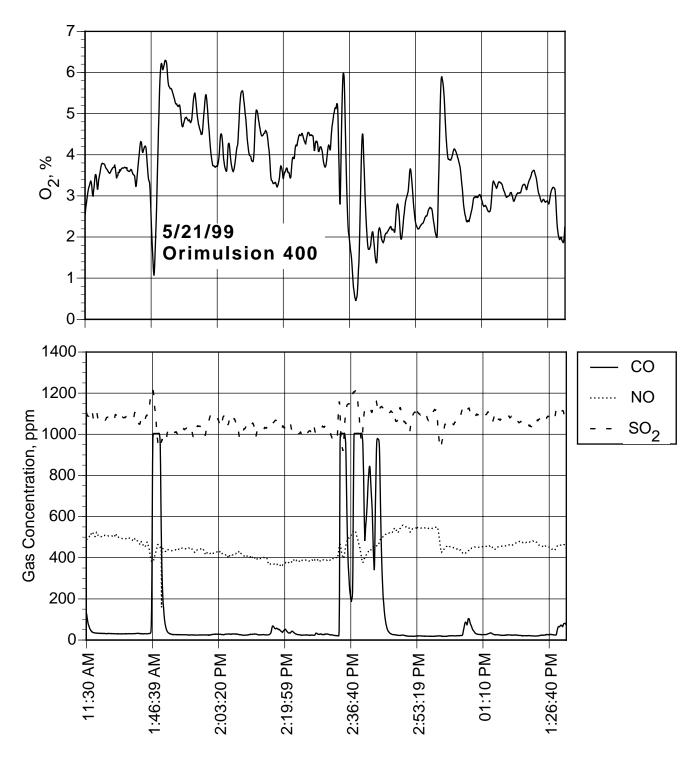
**Figure B-1**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 18, 1999 during EPA's pilot-scale testing of Orimulsion 400.



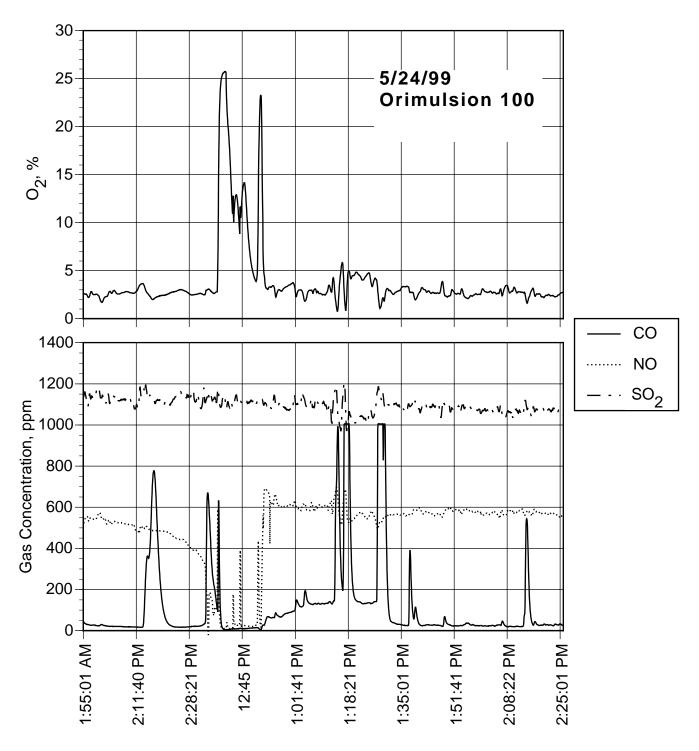
**Figure B-2**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 19, 1999 during EPA's pilot-scale testing of Orimulsion 400.



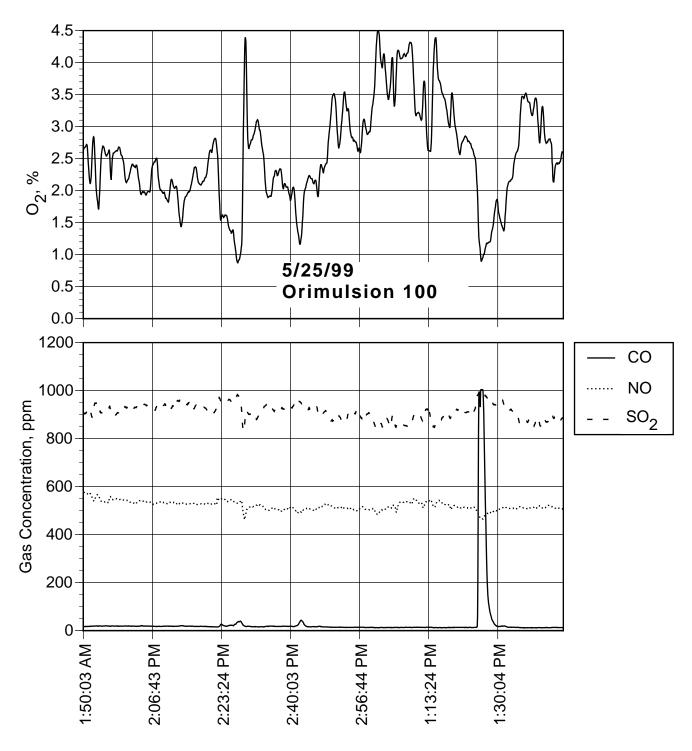
**Figure B-3**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 20, 1999 during EPA's pilot-scale testing of Orimulsion 400.



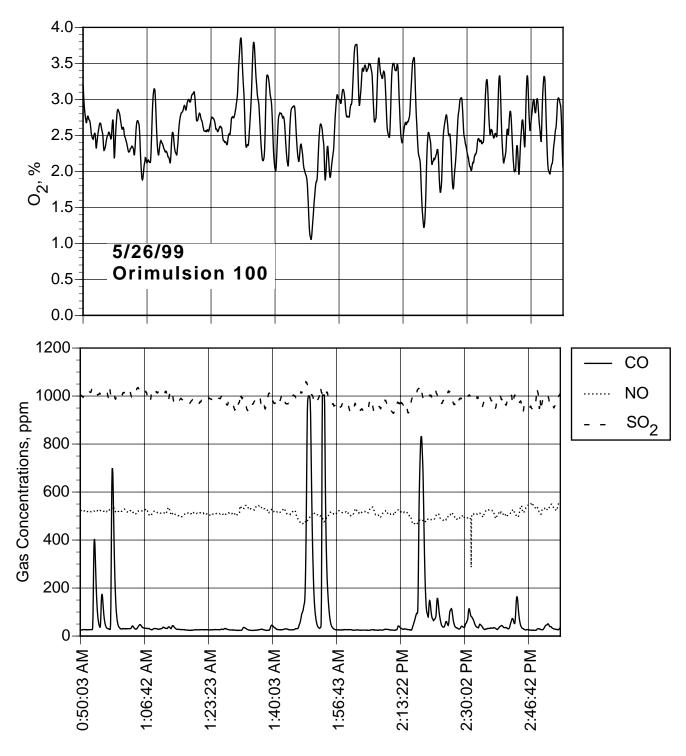
**Figure B-4**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 21, 1999 during EPA's pilot-scale testing of Orimulsion 400.



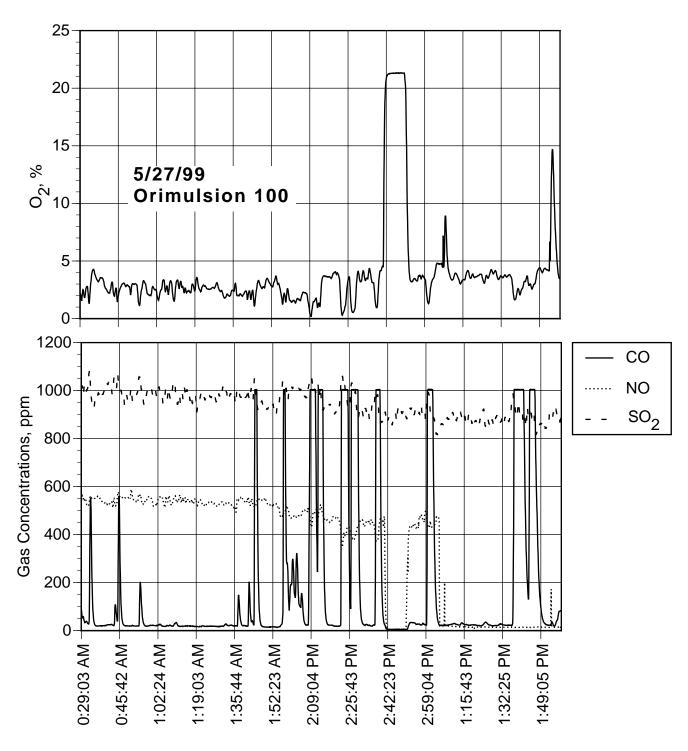
**Figure B-5**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 24, 1999 during EPA's pilot-scale testing of Orimulsion 100.



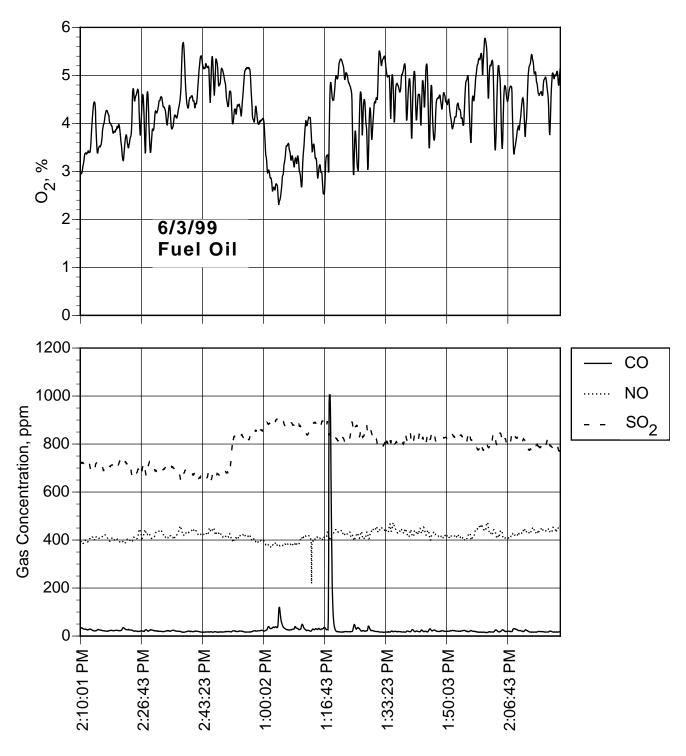
**Figure B-6**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 25, 1999 during EPA's pilot-scale testing of Orimulsion 100.



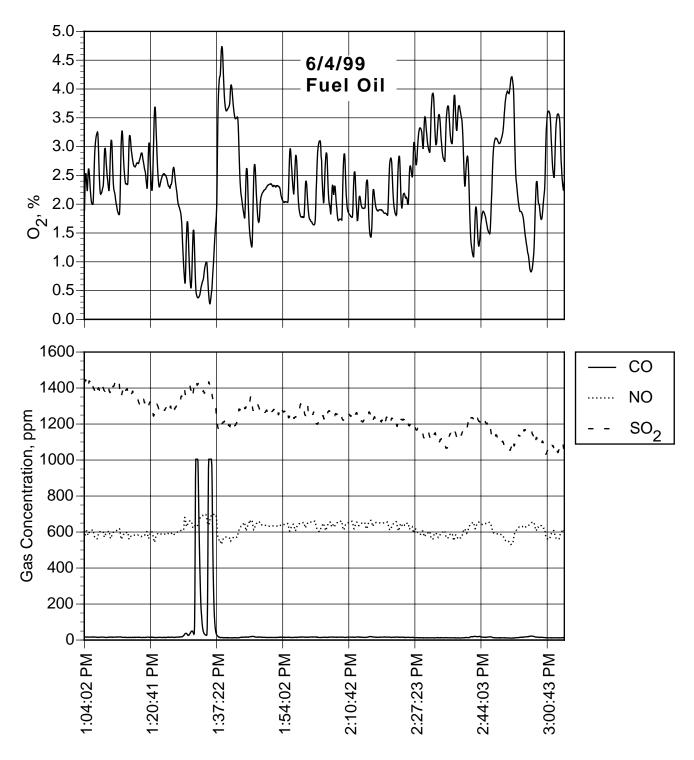
**Figure B-7**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 26, 1999 during EPA's pilot-scale testing of Orimulsion 100.



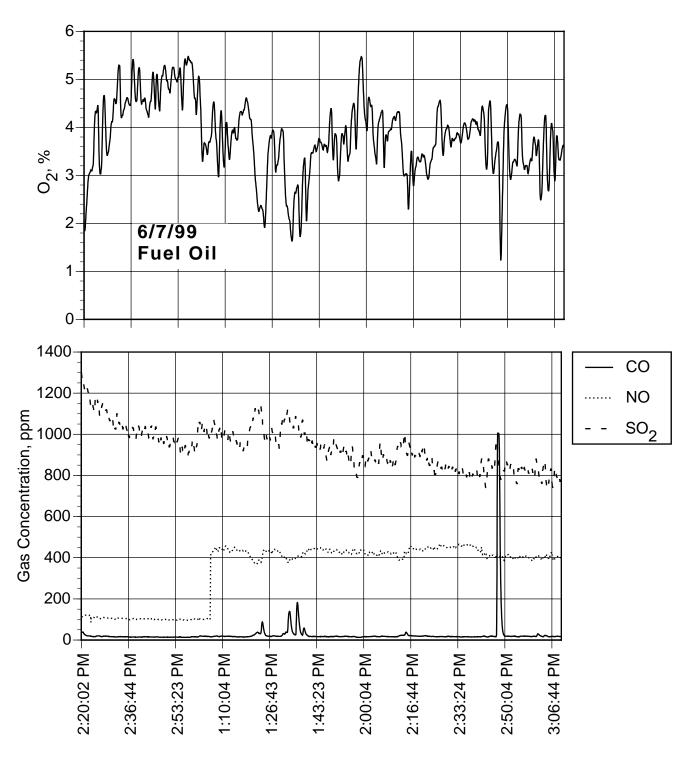
**Figure B-8**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken May 27, 1999 during EPA's pilot-scale testing of Orimulsion 100.



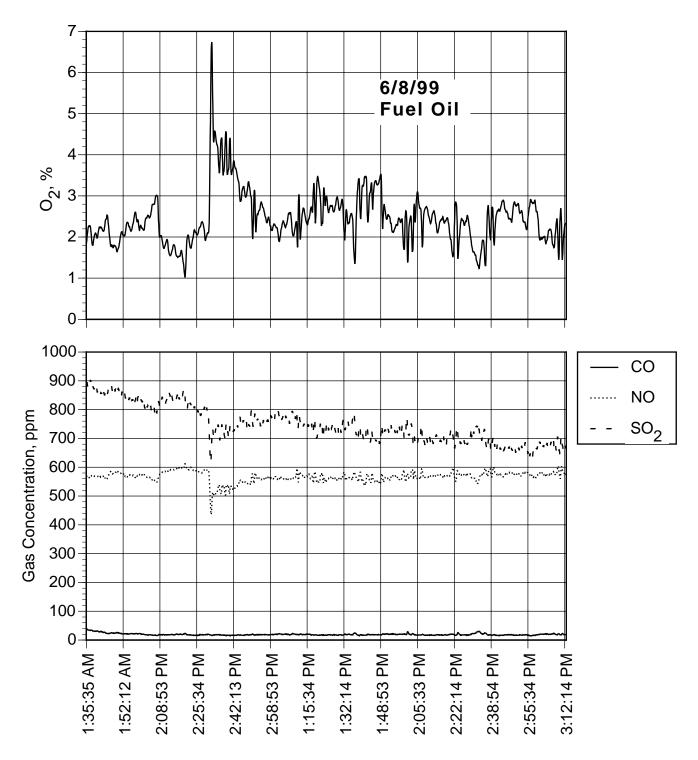
**Figure B-9**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken June 3, 1999 during EPA's pilot-scale testing of No. 6 fuel oil.



**Figure B-10**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken June 4, 1999 during EPA's pilot-scale testing of No. 6 fuel oil.



**Figure B-11**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken June 7, 1999 during EPA's pilot-scale testing of No. 6 fuel oil.



**Figure B-12**. CEM data for O<sub>2</sub> (top), CO, NO, and SO<sub>2</sub> (bottom) taken June 8, 1999 during EPA's pilot-scale testing of No. 6 fuel oil.

## **APPENDIX C Volatile Organic Compound Analysis Laboratory Reports**

Concentrations of volatile organic compounds (VOCs) were measured in EPA's Organics Support Laboratory, located in the Environmental Research Center in Research Triangle Park, NC. Analyses were conducted by chemists from ARCADIS Geraghty & Miller, the contractor for EPA's Air Pollution Prevention and Control Division.

The analyses were conducted to specifically determine levels of benzene, ethylene, toluene, and xylenes (BTEX), which were the criteria compounds for the analyses. The laboratory report stated that other compounds detected may have been outside the criteria used for BTEX, and the data should be evaluated using the case narrative supporting the data.

The following pages are the detailed case narrative and laboratory reports for each of the three samples collected from each of the three fuels. Also included are the matrix spike and matrix spike dupicate results and the results from the field blank used to evaluate laboratory contamination of the samples.

#### Case Narrative for Orimulsion VOST Analysis by GC/MS

A 5-point initial calibration was performed on April 28th and 29th, 1999. Each calibration level and the method detection limit study was performed by flash evaporation at 235°C of methanolic aliquots of standard VOC's. Each VOST pair was allowed to stand for 5 minutes (after flash evaporation) at a flow of 10mL/min, transferred to the GC/MS clamshell heater and thermally desorbed onto the GC/MS system. In an effort to ensure proper thermal transfer for all of the target compounds, each VOST tube pair was positioned to bias the Tenax portion fully into the heated zone. The calibration ranged between 10 ng and 250 ng on column. Internal standards were injected into the sidearm of the sparging vessel during each calibration and analysis. All target analytes had a relative standard deviation less than 30 % for this initial calibration.

Next, a 6 point method detection limit study was performed by spiking and analyzing a clean, VOST pair with the low level standard of 10 nanograms for each target VOC and surrogate VOC in accordance with SW-846 methodology for determination of detection limits. All target analytes had method detection limit values at least a factor of 2 less than the lowest calibration (PQL) except for two brominated compounds and tetrachloroethylene which were both below the PQL of 10 ng. Replicated matrix spikes of a separate BTEX standard was peformed using flash evaporation. Spike recoveries ranged from 87 % to 116 % (values not composited into a table but submitted in the regular report format). Two composited tables inclusive of the calibration response factor data and the method detection limit study are attached.

A mid-level standard was performed prior to daily sample analysis. Relative percent deviations less than 30 % when compared to the average response factors formed from the initial calibration were found for all target analytes of interest. The 4-bromofluorobenzene peak chosen from this standard passed method tuning criteria on each day. Prior to sample analysis, the system's inherent background for target components was determined. Sample VOST tubes were spiked prior to field sampling with surrogate compounds specified by the method. Samples were tagged on the data spreadsheets to reflect the target VOC background determined from the most recent matrix blank (other qualifiers were also attached). Values lower than the calculated MDL for a few compounds such as dichloromethane, toluene, 1,2-dibromoethane, m,p xylenes, bromobenzene and the dichlorobenzenes were noticed. The field blank demonstrated that all compounds were below the calculated detection limit except for dichloromethane (which was directly on the detection limit of 3.7 ng). All samples had similar results with low to mid-range values of benzene, toluene, xylenes and styrene present. Carbon disulfide and dichloromethane were present at varying levels. If you have any questions, please give Dennis (ext...2686) a call.

Bill Preston

Arcadis Geraghty & Miller Chemist

### Orimulsion VOST Method Detection Limit Study

	4/28/99	4/29/99	4/29/99	4/29/99	4/29/99	4/29/99		
Analyte	Run #1	Run #2	Run #3	Run #4	Run #5	Run #6	Std Dev	MDL(ng)
1,1 Dichloroethene	8.90	7.99	7.62	7.86	7.93	8.02	0.49	1.6
Iodomethane	10.45	9.40	8.47	7.99	8.07	7.69	1.04	3.5
Carbon Disulfide	8.37	7.60	7.15	7.21	7.31	7.47	0.50	1.7
Dichloromethane	14.04	13.74	13.55	13.88	16.23	17.06	1.10	3.7
t-1,2-Dichloroethene	9.52	8.84	8.61	8.65	8.64	8.60	0.38	1.3
1,1-Dichloroethane	9.55	8.73	8.33	8.51	8.90	9.35	0.47	1.6
c-1,2-Dichloroethane	9.97	9.27	8.80	9.15	9.05	8.56	0.44	1.5
Bromochloromethane	10.10	8.48	8.15	8.44	8.94	9.78	0.77	2.6
Chloroform	9.79	9.13	8.68	9.31	8.54	9.61	0.50	1.7
1,1,1-Trichloroethane	9.57	9.64	9.06	9.44	8.77	9.40	0.37	1.2
Carbon Tetrachloride	9.45	9.57	9.02	9.20	8.79	9.24	0.32	1.1
1,2-Dichloroethane	10.59	9.21	8.80	9.74	8.94	10.06	0.73	2.4
Benzene	13.14	12.06	11.94	10.72	11.69	12.43	0.87	2.9
Trichloroethene	10.15	9.52	11.40	9.99	8.72	9.04	0.98	3.3
1,2-Dichloropropane	9.83	9.53	11.86	9.94	8.93	9.89	1.10	3.7
Dibromomethane	10.54	8.91	10.76	9.87	8.39	9.45	1.02	3.4
Bromodichloromethane	9.64	9.18	9.97	9.69	7.54	7.51	0.97	3.3
c-1,3-Dichloropropene	9.90	8.84	10.27	9.84	7.72	8.70	1.04	3.5
Toluene	11.91	12.16	11.13	12.00	10.56	11.17	0.68	2.3
t-1,3-Dichloropropene	11.22	9.41	8.25	10.07	8.07	8.38	1.31	4.4
1,1,2-Trichloroethane	10.64	8.64	7.91	9.89	7.47	7.59	1.33	4.5
Tetrachloroethene	10.18	10.23	9.63	12.82	8.63	9.46	1.55	5.2
Dibromochloromethane	9.06	8.85	9.43	12.01	6.96	6.90	1.81	6.1
1,2-Dibromoethane	10.39	8.39	9.72	12.34	7.57	8.25	1.85	6.2
Chlorobenzene	10.11	9.33	8.55	10.66	7.65	7.98	1.20	4.0
Ethylbenzene	9.99	9.36	8.81	10.93	8.08	8.13	1.09	3.7
m,p-Xylenes	17.44	15.83	15.16	19.40	14.00	13.58	2.10	7.1
o-Xylene	10.13	9.05	8.67	11.41	8.03	7.47	1.33	4.5
Styrene	10.57	8.93	8.78	11.31	8.05	7.22	1.36	4.6
Bromobenzene	9.95	9.37	8.40	10.87	7.48	7.06	1.32	4.4
1,4-Dichlorobenzene	9.74	9.21	8.33	10.72	7.52	6.89	1.24	4.2
1,3-Dichlorobenzene	9.70	8.53	8.11	10.57	7.36	6.53	1.28	4.3
1,2-Dichlorobenzene	9.80	8.81	8.25	10.30	7.37	6.49	1.18	4.0

#### Response Factor Report Volatile

: H:\HPCHEM\2\METHODS\V042899.M (Chemstation Integrator) Method

Title : Orimulsion VOST analysis by Method 5041
Last Update : Wed May 05 20:07:56 1999
Response via : Initial Calibration

Calibration Files

2 =VS24289A.D =VS14289B.D =VS34289A.D 1 3

=VS54299A.D =VS44289A.D 5 4

	Compound	3	2	1	4	5	Avg	%RSD
1) I	Pentafluorobenzene							
2)	ccc-1,1-Dichloroethen							10.32
3)	Iodomethane		0.772					9.30
4)	Carbon disulfide		1.709					12.47
5)	Dichloromethane		0.839					24.45
6)	trans-1,2-Dichloroeth							8.70
7)	1,1-Dichloroethane		1.007					9.60
8)	cis-1,2-Dichloroethen							9.23
9)	Bromochloromethane		0.677					8.88
10)	ccc-Chloroform		1.000					10.11
11)	1,1,1-Trichloroethane							10.49
12)	Carbon tetrachloride		0.623					11.86
13) S	d4-1,2 Dichloroethane							12.38
14)	1,2-Dichloroethane		0.520					13.53
15)	Benzene	1.792	1.864	2.290	1.511	1.254	1.742	22.40
16) I	1,4-Diflluorobenzene			1	STD			
17)	Trichloroethene	0.500	0.540				0.498	6.29
18)	ccc-1,2-Dichloroprop							8.66
19)	Dibromomethane		0.258					6.28
20)	Bromodichloromethane		0.572					10.89
21)	cis-1,3-Dichloroprope							9.00
22) s	d8-Toluene	1.061	1.253	1.290	1.109	0.992	1.141	11.10
23)	ccc-Toluene		1.395					13.56
24)	trans-1,3-Dichloropro							15.92
25)	1,1,2-Trichloroethane	0.185	0.231	0.201	0.195	0.138	0.190	17.76
26)	Tetrachloroethene		0.350					7.71
27)	Dibromochloromethane		0.336					17.04
28)	1,2-Dibromoethane		0.309					13.75
29) I	d5-Chlorobenzene			_	STD			
30)	Chlorobenzene		1.074					14.93
31)	ccc-Ethylbenzene		1.892					14.25
32)	m,p-Xylenes		0.591					19.51
33)	o-Xyl <b>en</b> e		0.548					16.38
34)	Styrene						0.623	19.69
35) S	4-Bromofluorobenzene		0.705					24.41
36)	Bromobenzene	0.309	0.443	0.337	0.323	0.281	0.338	18.37
37)	d4-1,4-Dichlorobenzen			I	STD			

(#) = Out of Range

V042899.M Fri Jul 16 17:10:43 1999

## Response Factor Report Volatile

Method : H:\HPCHEM\2\METHODS\V042899.M (Chemstation Integrator)
Title : Orimulsion VOST analysis by Method 5041
Last Update : Wed May 05 20:07:56 1999
Response via : Initial Calibration

Calibration Files

=VS14289B.D 2 =VS24289A.D 1 =VS34289A.D 3

5 =VS54299A.D =VS44289A.D 4

	Compound	3	2	1	4	5	Avg	%RSD
38) 39) 40)	1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-dichlorobenzene	0.895	1.350	0.968	0.962	0.816	1.030 0.998 0.872	20.64

(#) = Out of Range V042899.M

Fri Jul 16 17:10:44 1999

Orimulsion Project: Date Sampled: 05/18/99 Sample Name: 5181405 Lab Sample ID: 9905029 Date Acquired: 05/24/99 Bill Preston MS Data file: V995299A Analyst: Dennis Tabor QC reviewer: Method: 5041A

#### Sample Description/Narrative:

Surrogates

Sample/905181405SV10BL04-Clamshell temp controller failed to maintain at 233°c and was noticed at 330°C after analysis/Benzene in blank at 2.9 ng

% Recovery

Satingaces	N ECCO	CI y			
d4-1,2-dichloroethane(surr)	86.1	P	•		
d8-toluene (surr)	100.4	P			
4-bromofluorobenzene(surr)	119.7	P			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	5.9	J	Toluene	19.3	
Dichloromethane	183.0		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	3.9	J
Carbon Tetrachloride	ND		m,p-Xylenes	11.9	J
1,2-Dichloroethane	ND		o-Xylene	ND	
Benzene	40.2	В	Styrene	16.5	
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

ND = not detected E = Peak over calibration range

B=detected in blank J = Peak below the calibration range

Orimulsion Project: 5191058 Date Sampled: 05/19/99 Sample Name: Lab Sample ID: 9905030 Date Acquired: 05/24/99 MS Data file: V995309A Analyst: **Bill Preston** Method: 5041A QC reviewer: Dennis Tabor

#### Sample Description/Narrative:

Surrogates

Sample/905191058SV20BL04-Clamshell desorber temp controller failed to maintain at 233°C and was noticed at 330°C after analysis/Benzene in blank at 2.9 ng

% Recovery

Duriogana	W 10001	<b></b> ,			
d4-1,2-dichloroethane(surr)	84.1	P			
d8-toluene (surr)	97.3	P			
4-bromofluorobenzene(surr)	107.6	P			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	5.5	J	c-1,3-Dichloropropene	ND	
Carbon Disulfide	59.9		Toluene	28.5	
Dichloromethane	59.9		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	ND	
Carbon Tetrachloride	ND		m,p-Xylenes	9.5	J
1,2-Dichloroethane	ND		o-Xylene	ND	
Benzene	102.9	В	Styrene	20.6	
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

ND = not detected E = Peak over calibration range
B=detected in blank J = Peak below the calibration range

Project: Orimulsion Sample Name: 5211256 Lab Sample ID: 9905041 MS Data file: V995419A

Date Sampled: Date Acquired: 05/24/99 Analyst:

05/21/99 Bill Preston Dennis Tabor

Method:

5041A

QC reviewer:

#### Sample Description/Narrative:

Sample/905211256SV10BL04-Clamshell temp controller failed to maintain at 233°c and was noticed at 330°C after analysis/Benzene in blank at 2.9 ng.

% Reco	very	•		
85.5	P			
32.2	F		-	
109.1	P			
ng		Compound	ng	
ND 6.1 72.4 64.3 ND	В	Toluene t-1,3-Dichloropropene 1,1,2-Trichloroethane Tetrachloroethene Dibromochloromethane 1,2-Dibromoethane Chlorobenzene Ethylbenzene m,p-Xylenes o-Xylene Styrene Bromobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene	ND ND 7.1 ND ND ND ND ND ND 22.3 ND ND ND	J
	85.5 32.2 109.1 ng ND 6.1 72.4 64.3 ND ND ND ND ND ND ND ND ND ND ND ND ND	85.5 P 32.2 F 109.1 P  ng  ND 6.1 J 72.4 64.3 ND	32.2 F 109.1 P  ng Compound  ND Bromodichloromethane 6.1 J c-1,3-Dichloropropene 72.4 Toluene 64.3 t-1,3-Dichloropropene ND 1,1,2-Trichloroethane ND Tetrachloroethane ND Dibromochloromethane ND L,2-Dibromoethane ND Chlorobenzene ND Bthylbenzene ND m,p-Xylenes ND o-Xylene 135.0 B Styrene ND Bromobenzene ND Bromobenzene ND 1,3-Dichlorobenzene ND 1,4-Dichlorobenzene	85.5 P 32.2 F 109.1 P  ng Compound ng  ND Bromodichloromethane ND 6.1 J c-1,3-Dichloropropene ND 72.4 Toluene 7.1 64.3 t-1,3-Dichloropropene ND ND 1,1,2-Trichloroethane ND ND Tetrachloroethane ND ND Dibromochloromethane ND ND Dibromochloromethane ND ND 1,2-Dibromoethane ND ND Chlorobenzene ND ND Ethylbenzene ND ND Ethylbenzene ND ND m,p-Xylenes 9.2 ND o-Xylene ND 135.0 B Styrene 22.3 ND Bromobenzene ND ND 1,3-Dichlorobenzene ND ND 1,3-Dichlorobenzene ND ND 1,3-Dichlorobenzene ND

E = Peak over calibration range B=detected in blank J = Peak below the calibration range

Project: Orimulsion Sample Name: 5241337 Date Sampled: 05/24/99 Lab Sample ID: 9905042 Date Acquired: 05/31/99 MS Data file: V990542A Analyst: Bill Preston Method: 5041A QC reviewer: Dennis Tabor

#### Sample Description/Narrative:

#### Sample/905241337SV10BL01

Surrogates	% Reco	very		
d4-1,2-dichloroethane(surr)	65.8	F		
d8-toluene (surr)	94.1	P		
4-bromofluorobenzene(surr)	115.0	P		
Compound	ng		Compound	ng
1,1 Dichloroethene	ND		Bromodichloromethane	ND
Iodomethane	ND		c-1,3-Dichloropropene	ND
Carbon Disulfide	7.6	J	Toluene	12.7
Dichloromethane	36.6		t-1,3-Dichloropropene	ND
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND
1,1-Dichloroethane	ND		Tetrachloroethene	ND
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND
Bromochloromethane	ND		1,2-Dibromoethane	ND
Chloroform	ND		Chlorobenzene	ND
1,1,1-Trichloroethane	ND		Ethylbenzene	ND
Carbon Tetrachloride	ND		m,p-Xylenes	ND
1,2-Dichloroethane	ND		o-Xylene	ND
Benzene	20.6		Styrene	ND
Trichloroethene	ND		Bromobenzene	ND
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND
Dibromomethane	ND		1,4-Dichlorobenzene	ND
			1,2-Dichlorobenzene	ND

ND = not detected E = Peak over calibration range B=detected in blank J = Peak below the calibration range

Orimulsion-Project: Date Sampled: 05/25/99 Sample Name: 5251243 Date Acquired: 05/31/99 Lab Sample ID: 9905051 MS Data file: V990551A Analyst: Bill Preston 5041A QC reviewer: Dennis Tabor Method:

#### Sample Description/Narrative:

#### Sample/905251243SV10BL01

Surrogates	% Recov	very			
d4-1,2-dichloroethane(surr)	100.9	P			
d8-toluene (suπ)	71.0	P			
4-bromofluorobenzene(surr)	119.8	P			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	3.0	J	Toluene	13.3	
Dichloromethane	10.7		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachioroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	ND	
Carbon Tetrachloride	ND		m,p-Xylenes	7.5	J
1,2-Dichloroethane	ND		o-Xylene	ND	
Benzene	55.2		Styrene	9.3	j
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

ND = not detected E = Peak over calibration range
B=detected in blank J = Peak below the calibration range

Project: Orimulsion
Sample Name: 5261102
Lab Sample ID: 9905057
MS Data file: V990557A

5041A

Date Sampled: 05/26/99
Date Acquired: 05/31/99
Analyst: Bill Preston
QC reviewer: Dennis Tabor

#### Sample Description/Narrative:

Method:

#### Sample/905261102SV10BL01

Surrogates	% Recov	ery			
d4-1,2-dichloroethane(surr)	73.1	P			
d8-toluene (surr)	96.3	P			
4-bromofluorobenzene(surr)	117.0	P			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	5.0	J	Toluene	19.1	
Dichloromethane	55.0		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ИŊ	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	3.7	J
Carbon Tetrachloride	ND		m,p-Xylenes	10.0	J
1,2-Dichloroethane	ND		o-Xylene	ND	
Benzene	73.6		Styrene	5.4	J
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

ND = not detected E = Peak over calibration range

B=detected in blank J = Peak below the calibration range

Project: Orimulsion

Sample Name: 6031301 Date Sampled: 06/04/99

Lab Sample ID: 9906006 Date Acquired: 06/17/99

MS Data file: V996006A Analyst: Bill Preston

Method: 5041A QC reviewer: Dennis Tabor

#### Sample Description/Narrative:

#### Sample/906031301SV10BLR6

Surrogates	% Reco	very	•	
d4-1,2-dichloroethane(surr)	64.7	F		
d8-toluene (surr)	90.7	P		
4-bromofluorobenzene(surr)	123.9	P		
Compound	ng		Compound	ng
1,1 Dichloroethene	ND		Bromodichloromethane	ND
Iodomethane	ND		c-1,3-Dichloropropene	ND
Carbon Disulfide	28.9		Toluene	47.9
Dichloromethane	ND		t-1,3-Dichloropropene	ND
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND
1,1-Dichloroethane	ND		Tetrachloroethene	ND
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND
Bromochloromethane	ND		1,2-Dibromoethane	ND
Chloroform	ND		Chlorobenzene	ND
1,1,1-Trichloroethane	ND		Ethylbenzene	30.9
Carbon Tetrachloride	ND		m,p-Xylenes	113.1
1,2-Dichloroethane	ND		o-Xylene	37.6
Benzene	23.6		Styrene	15.3
Trichloroethene	ND		Bromobenzene	ND
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND
Dibromomethane	ND		1,4-Dichlorobenzene	ND
			1,2-Dichlorobenzene	ND
				• • •

ND = not detected E = Peak over calibration range B = detected in blank J = Peak below the calibration range

Orimulsion Project: 6041340 Date Sampled: 06/04/99 Sample Name: Lab Sample ID: 9906015 Date Acquired: 06/17/99 Bill Preston Analyst: MS Data file: V996015A QC reviewer: Dennis Tabor Method: 5041A

#### Sample Description/Narrative:

#### Sample/906041340SV10BLR6

Surregates	% Recov	very			
d4-1,2-dichloroethane(surr)	57.3	F			
d8-toluene (surr)	95.5	P			
4-bromofluorobenzene(surr)	134.1	F			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	7.2	J	Toluene	13.7	
Dichloromethane	383.8		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	5.2	J
Carbon Tetrachloride	ND		m,p-Xylenes	23.9	
1,2-Dichloroethane	ND		o-Xylene	6.4	
Benzene	20.0		Styrene	10.0	
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

E = Peak over calibration range B=detected in blank J = Peak below the calibration range

Orimulsion Project: 6071305 Date Sampled: 06/07/99 Sample Name: Date Acquired: 06/16/99 Lab Sample ID: 9906018 Bill Preston MS Data file: V990618A Analyst: Method: 5041A QC reviewer: Dennis Tabor

#### Sample Description/Narrative:

Sample/906071305SV10BLR6 Benzene in matrix blank at 4.9 ng.

Surrogates	% Recov	very			
d4-1,2-dichloroethane(surr)	64.5	F			
d8-toluene (surr)	82.0	P			
4-bromofluorobenzene(surr)	157.0	F			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	22.3		Toluene	25.9	
Dichloromethane	ND		t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	ND		Ethylbenzene	8.2	J
Carbon Tetrachloride	ND		m,p-Xylenes	36.7	
1,2-Dichloroethane	ND		o-Xylene	9.9	J
Benzene	16.0	В	Styrene	10.4	
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

E = Peak over calibration range ND = not detected B≈detected in blank J = Peak below the calibration range

Project:

Method:

Surrogates

Orimulsion

Sample Name:

4301230/FB 9905001 Date Sampled: Date Acquired:

04/30/99 04/30/99

Lab Sample ID: MS Data file:

V995001A 5041A

Analyst: QC reviewer:

Bill Preston Dennis Tabor

Sample Description/Narrative:

Sample/904301230SV10BLR6/Field Blank

3.7 ng of dichloromethane was in the matrix blank

Uu					
d4-1,2-dichloroethane(surr)	91.6	P			
d8-toluene (surr)	101.6	P			
4-bromofluorobenzene(surr)	120.6	P			
Compound	ng		Compound	ng	
1,1 Dichloroethene	ND		Bromodichloromethane	ND	
Iodomethane	ND		c-1,3-Dichloropropene	ND	
Carbon Disulfide	ND		Toluene	2.3	J
Dichloromethane	3.7	J,B	t-1,3-Dichloropropene	ND	
t-1,2-Dichloroethene	ND		1,1,2-Trichloroethane	ND	
1,1-Dichloroethane	ND		Tetrachloroethene	ND	
c-1,2-Dichloroethane	ND		Dibromochloromethane	ND	
Bromochloromethane	ND		1,2-Dibromoethane	ND	
Chloroform	ND		Chlorobenzene	ND	
1,1,1-Trichloroethane	. ND		Ethylbenzene	ND	
Carbon Tetrachloride	ND		m,p-Xylenes	ND	
1,2-Dichloroethane	ND		o-Xylene	ND	
Benzene	ND		Styrene	ND	
Trichloroethene	ND		Bromobenzene	ND	
1,2-Dichloropropane	ND		1,3-Dichlorobenzene	ND	
Dibromomethane	ND		1,4-Dichlorobenzene	ND	
			1,2-Dichlorobenzene	ND	

% Recovery

ND = not detected

E = Peak over calibration range

B=detected in blank

J = Peak below the calibration range

Orimulsion Project: Sample Name: Date Spiked: 05/25/99 Matrix Spike Date Acquired: 05/25/99 Lab Sample ID: 9905049 V990549a Analyst: **Bill Preston** MS Data file: QC reviewer: Dennis Tabor 5041A Method:

#### Sample Description/Narrative:

#### Tenax-B05689/T/C-B05695

Matrix Spike #1 at 150 ng each B,T,E,X component

Surrogates	% Recovery			
d4-1,2-dichloroethane(surr)	86.6	P		
d8-toluene (surr)	103.9	P		
4-bromofluorobenzene(surr)	112.7	P		

Compound	ng	Compound	ng
1.1 Dichloroethene	NS	Bromodichloromethane	NS
Iodomethane	NS	c-1,3-Dichloropropene	NS
Carbon Disulfide	NS	Toluene	145.3
Dichloromethane	NS	t-1,3-Dichloropropene	NS
t-1.2-Dichloroethene	NS	1,1,2-Trichloroethane	NS
1.1-Dichloroethane	NS	Tetrachloroethene	NS
c-1,2-Dichloroethane	NS	Dibromochloromethane	NS
Bromochloromethane	NS	1,2-Dibromoethane	NS
Chloroform	NS	Chlorobenzene	NS
1,1,1-Trichloroethane	NS	Ethylbenzene	161.4
Carbon Tetrachloride	NS	m,p-Xylenes	173.8
1,2-Dichloroethane	NS	o-Xylene	168.8
Benzene	135.0	Styrene	NS
Trichloroethene	NS	Bromobenzene	NS
1,2-Dichloropropane	NS	1,3-Dichlorobenzene	NS
Dibromomethane	NS	1,4-Dichlorobenzene	NS
		1,2-Dichlorobenzene	NS

ND = not spiked E = Peak over calibration range B = detected in blank J = Peak below the calibration range

Orimulsion Project: 05/25/99 Date Spiked: Sample Name: Matrix Spike 05/25/99 Lab Sample ID: 9905050 Date Acquired: Analyst: Bill Preston V990550A MS Data file: QC reviewer: Dennis Tabor Method: 5041A

#### Sample Description/Narrative:

#### Tenax-B05689/T/C-B05695

Matrix Spike #2 at 150 ng each B,T,E,X component

Surrogates	% Recovery	<i>'</i>	
d4-1,2-dichloroethane(surr)	87.5 P		
d8-toluene (surr)	89.4 P		
4-bromofluorobenzene(surr)	112.5 P		
Compound	ng	Compound	ng
1,1 Dichloroethene	NS	Bromodichloromethane	NS
Iodomethane	NS	c-1,3-Dichloropropene	NS
Carbon Disulfide	NS	Toluene	139.9
Dichloromethane	NS	t-1,3-Dichloropropene	NS
t-1,2-Dichloroethene	NS	1,1,2-Trichloroethane	NS
1,1-Dichloroethane	NS	Tetrachloroethene	NS
c-1,2-Dichloroethane	NS	Dibromochloromethane	NS
Bromochioromethane	NS	1,2-Dibromoethane	NS
Chloroform	NS	Chlorobenzene	NS
1,1,1-Trichloroethane	NS	Ethylbenzene	169.0
Carbon Tetrachloride	NS	m,p-Xylenes	172.0
1,2-Dichloroethane	NS	o-Xylene	172.9
Benzene	130.4	Styrene	NS
Trichloroethene	NS	Bromobenzene	NS
1,2-Dichloropropane	NS	1,3-Dichlorobenzene	NS
Dibromomethane	NS	1,4-Dichlorobenzene	NS

ND = not spiked E = Peak over calibration range J = Peak below the calibration range

NS

1,2-Dichlorobenzene

# APPENDIX D Semivolatile Organic Compound Analysis Laboratory Reports

#### Case Narrative for Orimulsion Semivolatile Analysis by Method 8270

A five-level calibration was performed on June 24 -25<sup>th</sup>, 1999. Levels 1 through 4 (10,30,60, and 90 ug/mL) were analyzed on June 24<sup>th</sup> and level 5 (100 ug/mL) was analyzed on June 25<sup>th</sup>,1999. The relative standard deviation of the average response factors throughout the calibration range was generally below 10 % with few exceptions. The relative standard deviation for 13C6-2,5-phthalic anhydride was the only constituent greater than 30 % at 37.21%. A rigorous method detection limit study was not performed prior to sample analysis. Past semivolatile analysis allowed insight for establishing an arbitrary cutoff of 1 ug/mL (1 ng on column) for the instrumental detection limit. Sample concentrations near this value were scrutinized carefully to ensure excellent retention time matching and adequate confirmation ion ratios.

Method 8270 daily sample analysis consisted of initially passing the DFTPP tuning criteria. The monitoring for the presence of benzidine in the DFTPP tuning solution (which was present in all cases) and the monitoring for DDT lack of degradation were done daily prior to sample analysis. After the DFTPP passed all tuning criteria, a mid-point calibration standard was analyzed. The mid-level standard was compared to the initial calibration curve. All constituents of interest were less than 30 % relative deviation in all cases.

Each sampling condition had three separate analyses: XAD, filter, and the condensate which were analyzed between July 25<sup>th</sup> and July 29<sup>th</sup>, 1999. Pre-extraction surrogates were spiked into every sample and pre-sampling surrogates (additional APPCD-OSL QC) were added to the XAD portions only. Generally, the pre-extraction and pre-sampling surrogates passed pass/fail criteria (a

table comprising the acceptance criteria for the pre-sampling and pre-extraction surrogates is attached). Replicated matrix spikes of PAHs of interest determined recovery values between 50% and 77% when compared to the initial calibration. This directly parallels the surrogates recovery data. All samples had very low to non-detectable levels for most of the PAH targets and for the additional analyte list with a few exceptions for phthalates. If you have any questions, please give me a call at ext...2719.

Arcadis Geraghty & Miller Chemist,

Bill Preston

#### Sheet1

## Surrogates Recovery Limits Used for the Orimulsion Study

Description	Recovery limits
2-Fluorophenol	24-113
d5-Phenol	25-121
2,4,6-Tribromophenol	19-122
d5-Nitrobenzene	23-120
2-Fluorobiphenyl	30-115

#### Response Factor Report Semi2

Method : F:\ORIMUL~1\METHODS\S062499.M (RTE Integrator)
Title : Orimulsion PAH Analysis by method 8270
Last Update : Wed Jul 28 08:42:17 1999

Response via : Initial Calibration

Calibration Files

=SC16249A.D 3 =SC36249A.D 2

=SC26249A.D 1 =SC16249A.D =SC56259A.D

	Compound	2	1	3	4	5	Avg	%RSD
								- <b>-</b>
1) i	D4-1,4-dichlorobenzen			IS	STD			
2)	n-Nitrosomethylethyla	0.743	0.757	0.815	0.817	0.816	0.790	4.64
3)	Methyl Methanesulfona	0.801	0.889	0.865	0.827	0.895	0.855	4.74
4) S	2-Fluorophenol(surr#1	1.506	1.625	1.522	1.446	1.512	1.522	4.25
5)	n-Nitrosodiethylamine	0.610	0.622	0.674	0.671	0.660	0.647	4.55
6)	Bis(2-chloroethyl)eth	1.396	1.567	1.435	1.358	1.478	1.447	5.58
7)	Ethyl methanesulfonat	1.460	1.593	1.577	1.488	1.588	1.541	4.05
8)	Aniline	1.692	2.127	1.535	1.594	1.616	1.713	13.91
9) S	D5-Phenol(surr#2)				1.662			4.62
10) M	Phenol(CCC)	1.832	2.004	1.899	1.797	1.855	1.878	4.26
11)	2-Chlorophenol	1.378	1.538	1.456	1.382	1.467	1.444	4.62
12)	1,3-Dichlorobenzene				1.632			1.84
13) M	1,4-Dichlorobenzene(C	1.653	1.778	1.712	1.647	1.744	1.707	3.33
14) s	13C6-1,2 dichlorobenz	1.448	1.273	1.436	1.391	1.414	1.392	5.06
15)	1,2-Dichlorobenzene	1.516	1.624	1.553	1.491	1.599	1.557	3.56
16)	Benzyl Alcohol	0.862	0.886	0.913	0.815	0.868	0.869	4.17
17)	Bis(2-chloroisopropyl	0.650	0.742	0.678	0.653	0.661	0.677	5.61
18)	2-Methylphenol	1.238	1.374	1.311	1.175	1.258	1.271	5.92
19)	n-Nitrosospyrrolidine	0.517	0.558	0.565	0.533	0.511	0.537	4.51
20)	Acetophenone	1.886	2.054	1.938	1.736	1.931	1.909	6.03
21)	Hexachloroethane	0.687	0.746	0.700	0.668	0.737	0.708	4.66
22)	4-methylphenol	2.541	2.889	2.611	2.275	2.507	2.565	8.61
23) M	N-nitrosodi-n-propyla	0.905	0.983	0.935	0.889	0.898	0.922	4.17
24) i	D8-Naphthalene(QS#2)				STD			
25) S	D5-Nitrobenzene (surr#				0.513			4.36
26)	Nitrobenzene				0.518			4.12
27)	1-Nitrosopiperidine				0.308			5.28
28)	Isophorone	0.936	1.053	0.977	0.965	1.013	0.989	4.56
29)	2,4-Dimethylphenol	0.326	0.359	0.337	0.336	0.339	0.339	3.64
30)	Bis(2-chloroethoxy)me	0.474	0.532	0.485	0.482	0.498	0.494	4.63
31) s	13C6-2.5 dichlorophen	0.320	0.288	0.330	0.332	0.325	0.319	5.53
32) M	2,4-Dichlorophenol(CC	0.317	0.340	0.329	0.322	0.344	0.330	3.53
33)	1,2,4-Trichlorobenzen	0.363	0.399	0.367	0.375	0.391	0.379	4.07
34) s	13C6-Napthalene (pre	1.122			1.094			3.75
35)	Naphthalene	1.073	1.158	1.086	1.048	1.109	1.095	3.81
36)	2-Nitrophenol(CCC)	0.227	0.236	0.243	0.242	0.247	0.239	3.36
37)	2,6-Dichlorophenol	0.313	0.331	0.328	0.323	0.337	0.327	2.71
38)	Hexachloropropene	0.235	0.243	0.250	0.258	0.272	0.252	5.73

(#) = Out of Range

of Range S062499.M Fri Jul 30 14:47:33 1999

#### Response Factor Report Semi2

Method : F:\ORIMUL~1\METHODS\S062499.M (RTE Integrator)
Title : Orimulsion PAH Analysis by method 8270
Last Update : Wed Jul 28 08:42:17 1999
Response via : Initial Calibration

#### Calibration Files

3 = SC36249A.D2 =SC26249A.D

=SC26249A.D 1 =SC16249A.D =SC56259A.D

		Compound	2	1	3	4	5	Avg	%RSD
39)		4-Chloroaniline	0.378	0.434	0.321	0.215	0.248	0.319	28.27
	М	Hexachlorobutadiene(C	0.214	0.219	0.219	0.227	0.238	0.223	4.24
41)		n-Nitrosodi-n-butylam	0.225	0.236	0.246	0.241	0.236	0.237	3.41
	M	4-Chloro-3-methyl-phe	0.312	0.353	0.330	0.321	0.340	0.331	4.80
43)	••	2-Methylnaphthalene	0.651	0.716	0.658	0.647	0.677	0.670	4.22
,		,,							
44)	i	D10-Acenaphthene (QS#3				STD			
45)		Isosafrole	0.549	0.574	0.588	0.578	0.584	0.575	2.69
46)	s	13C6-Phthalic Anhydri	0.135	0.153	0.139	0.083	0.236	0.149	37.21
47)		1,2,4,5-Tetrachlorobe	0.670	0.707	0.709	0.709	0.722	0.704	2.79
48)	M	Hexachlorocyclopentad	0.429	0.426	0.460	0.462	0.465	0.448	4.36
49)	М	2,4,6-Trichlorophenol	0.434	0.452	0.464	0.463	0.458	0.454	2.63
50)		2,4,5-Trichlorophenol	0.471	0.483	0.492	0.484	0.489	0.484	1.64
51)	S	2-Fluorobiphenyl(surr	1.339	1.468	1.406	1.367	1.408	1.398	3.48
52)		2-Chloronaphthalene				0.478			1.49
53)		1,3 Dinitrobenzene				0.269			4.75
54)		2-Nitroaniline				0.475			2.17
55)		3-Nitroaniline				0.371			2.81
56)		Safrole				0.261			1.88
57)		Acenaphthylene				1.922			2.81
58)		1,4-Naphthoquinone				0.301			5.53
59)		Dimethylphathalate				1.408			2.09
60)		2,6-Dinitrotoluene				0.351			2.61
61)	M	Acenaphthene (CCC)				1.168			3.32
62)		1-Napthylamine				0.760			7.67
63)		2-Napthylamine				0.371			16.02
64)		4-Nitroaniline	0.543	0.540	0.463	0.463	0.518	0.505	7.83 15.74
65)	M	2,4-Dinitrophenol(SPC	0.163	0.136	0.187	0.196	1 746	1 714	2.57
66)		Dibenzofuran				1.666 0.535			2.84
67)		Pentachlorobenzene				0.333			4.06
68)		2,4-Dinitrotoluene 2,3,4,6-Tetrachloroph	0.440	0.433	0.447	0.449	0.407	0.430	1.80
69)			0.333	0.344	0.333	0.319	0.340	0.333	4.57
70)	M	4-Nitrophenol(SPCC)				1.267			3.67
71)		Fluorene				1.422			4.27
72)		Diethyl phathalate				0.644			1.88
73)		4-Chlorophenyl phenyl 2-Methyl-4,6-dinitrop							9.23
74)		5-Nitro-o-toluidine	0.232	0.220	0.203	0.351	0.293	0.203	7.05
75)						1.072			2.03
76)	d	Diphenylamine 2,4,6-Tribromophenol(							2.90
77)	S	2,4,6-111bromophenor(	0.179	0.102	0.103	0.103	U.I93	0.104	2.50

(#) = Out of Range S062499.M Fri Jul 30 14:47:41 1999

#### Response Factor Report Semi2

Method : F:\ORIMUL~1\METHODS\S062499.M (RTE Integrator)
Title : Orimulsion PAH Analysis by method 8270

Last Update : Wed Jul 28 08:42:17 1999

Response via: Initial Calibration

Calibration Files

2 =SC26249A.D 1 =SC16249A.D 3 =SC36249A.D 4 =SC46249A.D 5 =SC56259A.D

		Compound	2	1	3	4	5	Avg	%RSD
78)		Diallate	0.698	0.763	0.674	0.656	0.713	0.701	5.86
79)		1,3,5-Trinitrobenzene	0.325	0.306	0.328	0.335	0.385	0.336	8.78
		-10 -1 (0.0%)			Τ.	3 m D			
80)	i	D10-Phenanthrene (QS#4		0.226					5.01
81)		4-Bromophenyl phenyl		0.226					3.13
82)		Phenacetin Hexachlorobenzene		0.472					3.80
83)		4-Aminobiphenyl		0.432					8.11
84)		Dinoseb		0.197					12.08
85) 86)	м	Pentachlorophenol (CCC	0.136	0.137	0.135	0.135	0.149	0.138	4.46
87)	1-1	Pentachloronitrobenze	0.093	0.096	0.098	0.098	0.104	0.098	4.09
88)		Phenanthrene	1.140	1.234	1.193	1.166	1.220	1.191	3.26
89)	s	d10-Anthracene		0.911					5.77
90)		Anthracene		1.262					3.03
91)		Di-n-butyl phthalate		1.578					3.12
92)		Isodrin		0.150					2.98
93)	M	Fluoranthene (CCC)	1.172	1.209	1.181	1.172	1.255	1.198	2.95
94)		3,3'-Dimethylbenzidin	0.245	0.324	0.256	0.257	0.296	0.275	12.16
95)		D12-Chrysene (QS#5)			т	STD	- <b>-</b>		
96)	1	Pyrene		1.661					2.77
97)		Chlorobenzilate		0.420					2.90
98)	S	D14-Terphenyl(surr#6)	0.922	0.998	0.974	0.974	0.999	0.973	3.19
99)	_	p-Dimethylaminoazoben	0.289	0.322	0.292	0.276	0.281	0.292	6.16
100)		2-Acetylaminofluorene	0.582	0.545	0.651	0.651	0.671	0.620	8.65
101)		Benzyl butyl phthalat	0.815	0.876	0.831	0.809	0.854	0.837	3.31
102)		3,3'-Dichlorobenzidin	0.382	0.434	0.427	0.412	0.433	0.417	5.24
103)		Benzo(a)anthracene	1.336	1.434	1.423	1.401	1.443	1.408	3.07
104)		Chrysene	1.255	1.338	1.346	1.345	1.374	1.332	3.36
1051		D12 Damilono (00#6)			T	STD			
105)		D12-Perylene (QS#6) di-n-Octyl phthalate(						1.938	3.52
106)	M	Benzo(b) fluoranthene						1.279	3.93
107) 108)		7,12-Dimethylbenz(a)a	0.520	0.568	0.565	0.562	0.585	0.560	4.27
100)		Benzo(k) fluoranthene	1.156	1.235	1.222	1.195	1.265	1.215	3.41
110)	М	Benzo(a) pyrene (CCC)						1.119	3.91
111)		3-Methylcholanthrene						0.544	3.26
112)		Indeno(1,2,3-cd)pyren							5.11
113)		Dibenz(a,h)anthracene	0.988	0.972	1.093	1.065	1.100	1.043	5.74
114)		Benzo(ghi)perylene	1.048	1.052	1.139	1.101	1.150	1.098	4.33

(#) = Out of Range

S062499.M Fri Jul 30 14:47:48 1999

Project:

Orimulsion

Date Sampled: Date Extracted: 05/18/99

Sample Name: Lab Sample ID: 905181131F 9905026

Date Acquired:

06/01/99 06/26/99

MS Data file:

S995026A

Analyst:

Bill Preston

Method:

8270

HRGC/LRMS

QC reviewer: **Extract Volume**  **Dennis Tabor** 

1

1 ml

**Dilution Factor** 

#### Sample Description/Narrative:

#### 905181131SBF0- Filter

Pre Extraction Surrogates	% Recover	y		% Recovery	y
2-Fluorophenol(surr#1)	59	P	D5-Nitrobenzene(surr#3)	70	P
D5-Phenol(surr#2)	71	P	2-Fluorobiphenyl(surr#4)	72	P
2,4,6-Tribromophenol(surr#5)	87	P	D14-Terphenyl(surr#6)	93	P
Pre Sampling Surrogates	% Recover	y		% Recover	y
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	1	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

Date Sampled: 05/18/99 Orimulsion Project: Date Extracted: 06/01/99 905181131F Sample Name: Date Acquired: 06/26/99 Lab Sample ID: 9905026 Bill Preston Analyst: MS Data file: S995026A QC reviewer: **Dennis Tabor** 8270 Method: 1 ml **Extract Volume HRGC/LRMS Dilution Factor** 1

## Sample Description/Narrative:

#### 905181131SBF0- Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	7
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND	·	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Project:

Orimulsion

Date Sampled:

5/18/99

Sample Name: Lab Sample ID: 905181131F

Date Extracted:

Date Acquired:

6/1/99 6/26/99

MS Data file:

9905026 S995026A

Analyst:

Bill Preston

Method:

8270

QC reviewer:

Bill Preston

HRGC/LRMS

QC reviewer:
Extract Volume

Dennis Tabor

Dilution Factor

1 ml 1

905181131SBF0- Filter

Sample Description/Narrative:

#### Compound μg Compound μg Benzo(a)pyrene(CCC) ND ND Chrysene J 3-Methylcholanthrene ND 7 di-n-Octyl phthalate(CCC) Indeno(1,2,3-cd)pyrene ND Benzo(b)fluoranthene ND Dibenz(a,h)anthracene 7,12-Dimethylbenz(a)anthracene ND ND Benzo(ghi)perylene ND Benzo(k)fluoranthene ND

Project:	Orimulsion	Date Sampled:	05/18/99	
Sample Name:	905181131X	Date Extracted:	06/01/99	
Lab Sample ID:	9905027	Date Acquired:	06/26/99	
MS Data file:	S995027A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 905181131WSBX0- XAD

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	80	P	D5-Nitrobenzene(surr#3)	89	P
D5-Phenol(surr#2)	66	P	2-Fluorobiphenyl(surr#4)	92	P
2,4,6-Tribromophenol(surr#5)	101	P	D14-Terphenyl(surr#6)	128	P
Pre Sampling Surrogates	% Recovery			% Recover	y
13C6-1,2 Dichlorobenzene	86		13C6-2,5 Dichlorophenol	92	
13C6-Napthalene	87		13C6-2,5-Phthalate anhydride	142	
D10-Anthracene	100				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	2	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	9	J
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	8	J	n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND =

ND = not detected

J = Peak below the calibration range

NS= not spiked

Project:	Orimulsion	Date Sampled:	05/18/99
Sample Name:	905181131X	Date Extracted:	06/01/99
Lab Sample ID:		Date Acquired:	06/26/99
MS Data file:	S995027A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

## **Sample Description/Narrative:**

#### 905181131WSBX0- XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	15
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	2	1	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Date Sampled: 5/18/99 Orimulsion Project: Date Extracted: 6/1/99 905181131X Sample Name: Date Acquired: 6/26/99 Lab Sample ID: 9905027 Analyst: Bill Preston MS Data file: S995027A QC reviewer: **Dennis Tabor** 8270 Method: 1 ml Extract Volume HRGC/LRMS 1 **Dilution Factor** 

### Sample Description/Narrative:

#### 905181131WSBX0- XAD

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
3	J 3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND 3 ND ND	ND Benzo(a)pyrene(CCC)  3 J 3-Methylcholanthrene  ND Indeno(1,2,3-cd)pyrene  ND Dibenz(a,h)anthracene

05/18/99 Date Sampled: Orimulsion Project: Date Extracted: NA 905181131C Sample Name: 06/26/99 Date Acquired: 9905028 Lab Sample ID: Bill Preston Analyst: S995028A MS Data file: QC reviewer: Dennis Tabor 8270 Method: 1 ml Extract Volume HRGC/LRMS 1 **Dilution Factor** 

#### Sample Description/Narrative:

## 905181131SBI0 Condensate-Not spiked with pre-extraction surrogates

Pre Extraction Surrogates	% Recovery		% Recovery
2-Fluorophenol(surr#1)	NS	D5-Nitrobenzene(surr#3)	NS
D5-Phenol(surr#2)	NS	2-Fluorobiphenyl(surr#4)	NS
2,4,6-Tribromophenol(surr#5)	NS	D14-Terphenyl(surr#6)	NS
Pre Sampling Surrogates	% Recovery		% Recovery
13C6-1,2 Dichlorobenzene	NS	13C6-2,5 Dichlorophenol	NS
13C6-Napthalene	NS	13C6-2,5-Phthalate anhydride	NS
D10-Anthracene	NS		
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND	4-Methylphenol	ND
Methyl Methanesulfonate	ND	N-nitrosodi-n-propylamine	ND
n-Nitrosodiethylamine	ND	Nitrobenzene	ND
Bis (2-chloroethyl) ether	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	ND	Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	ND
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	ND	n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

Orimulsion Project: 905181131C Sample Name: 9905028 Lab Sample ID:

MS Data file: Method:

S995028A 8270

HRGC/LRMS

Date Sampled:

05/18/99 Date Extracted: NA

Date Acquired:

**Bill Preston** 

06/26/99

QC reviewer:

Analyst:

Dennis Tabor

**Extract Volume** Dilution Factor

1 ml 1

110

J

## Sample Description/Narrative:

905181131SBI0 Condensate-Not spiked with pre-extraction surrogates

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	3
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

Project:

Orimulsion

Date Sampled:

5/18/99

Sample Name:

905181131C

Date Extracted: NA

Lab Sample ID:

9905028

Date Acquired:

6/26/99

MS Data file:

S995028A

Analyst:

**Bill Preston** 

Method:

8270

QC reviewer:

HRGC/LRMS

**Extract Volume** 

**Dennis Tabor** 1 ml

**Dilution Factor** 

1

#### **Sample Description/Narrative:**

905181131SBI0 Condensate-Not spiked with pre-extraction surrogates

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	2	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	05/19/99	
Sample Name:	905191016F	Date Extracted:	06/01/99	
Lab Sample ID:	9905032	Date Acquired:	06/26/99	
MS Data file:	S995032A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 905191016SBF0 Filter

Pre Extraction Surrogates	% Recovery			% Recove	rv
2-Fluorophenol(surr#1)	51 P	>	D5-Nitrobenzene(surr#3)	58	P
D5-Phenol(surr#2)	61 P	•	2-Fluorobiphenyl(surr#4)	62	P
2,4,6-Tribromophenol(surr#5)	78 P	•	D14-Terphenyl(surr#6)	105	P
Pre Sampling Surrogates	% Recovery			% Recove	rv
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	•
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS		•		
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E =exceeded calib ND =not detected J =Peak below the calibration range NS =not spiked

Project:	Orimulsion	Date Sampled:	05/19/99
	905191016F	Date Extracted:	06/01/99
Lab Sample ID:		Date Acquired:	06/26/99
MS Data file:	S995032A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
Michiod.	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

## Sample Description/Narrative:

#### 905191016SBF0 Filter

Compound	μg	Compound	μg	
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND	
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND	
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND	
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND	
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND	
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND	
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND	
1,3 Dinitrobenzene	ND	Phenacetin	ND	
2-Nitroaniline	ND	Hexachlorobenzene	ND	
3-Nitroaniline	ND	4-Aminobiphenyl	ND	
Safrole	ND	Dinoseb	ND	
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND	
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND	
Dimethyl phathalate	ND	Phenanthrene	ND	
2,6-Dinitrotoluene	ND	Anthracene	ND	
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	15	
1-Napthylamine	ND	Isodrin	ND	
2-Napthylamine	ND	Fluoranthene(CCC)	ND	
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND	
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND	
Dibenzofuran	ND	Chlorobenzilate	ND	
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND	
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND	
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	3	J
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND	
Fluorene	ND	Benzo(a)anthracene	ND	
Diethyl phathalate	1	J		
<b>→</b> 1				

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Date Sampled: 5/19/99 Orimulsion Project: Date Extracted: 6/1/99 905191016F Sample Name: Date Acquired: 6/26/99 9905032 Lab Sample ID: Bill Preston Analyst: MS Data file: S995032A QC reviewer: **Dennis Tabor** 8270 Method:

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

#### **Sample Description/Narrative:**

#### 905191016SBF0 Filter

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
2	J 3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND 2 ND ND	ND Benzo(a)pyrene(CCC)  2 J 3-Methylcholanthrene  ND Indeno(1,2,3-cd)pyrene  ND Dibenz(a,h)anthracene

Project:	Orimulsion	Date Sampled:	05/19/99	
Sample Name:	905191016C	Date Extracted:	06/01/99	
Lab Sample ID:	9905034	Date Acquired:	06/26/99	
MS Data file:	S995034A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1 .	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 905191016SBI0 Condensate

Pre Extraction Surrogates	% Recovery			% Recove	ry
2-Fluorophenol(surr#1)	39	P	D5-Nitrobenzene(surr#3)	64	P
D5-Phenol(surr#2)	34	P	2-Fluorobiphenyl(surr#4)	67	P
2,4,6-Tribromophenol(surr#5)	87	P	D14-Terphenyl(surr#6)	113	P
Pre Sampling Surrogates	% Recovery			% Recove	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

05/19/99 Date Sampled: Project: Orimulsion 06/01/99 Date Extracted: 905191016C Sample Name: Date Acquired: 06/26/99 Lab Sample ID: 9905034 Analyst: Bill Preston MS Data file: S995034A QC reviewer: Dennis Tabor Method: 8270 Extract Volume 1 ml HRGC/LRMS 1 **Dilution Factor** 

#### **Sample Description/Narrative:**

#### 905191016SBI0 Condensate

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Project: Orimulsion
Sample Name: 905191016C
Lab Sample ID: 9905034
MS Data file: S995034A
Method: 8270

9905034 Date Acquired: 6/26/99 S995034A Analyst: Bill Preston 8270 QC reviewer: Dennis Tabor

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

Date Sampled:

Date Extracted: 6/1/99

5/19/99

## Sample Description/Narrative:

905191016SBI0 Condensate

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	05/19/99	
Sample Name:	905191016X	Date Extracted:	06/01/99	
Lab Sample ID:	9905033	Date Acquired:	06/26/99	
MS Data file:	S995033A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
1/10011041	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

#### 905191016SBX0 XAD

Pre Extraction Surrogates	% Recovery			% Recovery	7
2-Fluorophenol(surr#1)	60	P	D5-Nitrobenzene(surr#3)	68	P
D5-Phenol(surr#2)	61	P	2-Fluorobiphenyl(surr#4)	72	P
2,4,6-Tribromophenol(surr#5)	89	P	D14-Terphenyl(surr#6)	119	P
Pre Sampling Surrogates	% Recovery			% Recovery	y
13C6-1,2 Dichlorobenzene	66		13C6-2,5 Dichlorophenol	70	
13C6-Napthalene	67		13C6-2,5-Phthalate anhydride	70	
D10-Anthracene	86		•		
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	4	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzen¢(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	6	J	n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	) ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Project:	Orimulsion	Date Sampled:	05/19/99
5	905191016X	Date Extracted:	06/01/99
Lab Sample ID:	9905033	Date Acquired:	06/26/99
MS Data file:	S995033A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
2.20	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

## Sample Description/Narrative:

#### 905191016SBX0 XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	13
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(\$PCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		
		'	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Project:	Orimulsion	Date Sampled:	05/21/99	
Sample Name:	905211135F	Date Extracted:	06/04/99	
Lab Sample ID:	9905043	Date Acquired:	06/27/99	
MS Data file:	S995043A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

#### 905211135SBF0 Filter

Pre Extraction Surrogates	% Recovery			% Recover	У
2-Fluorophenol(surr#1)	44	P	D5-Nitrobenzene(surr#3)	52	P
D5-Phenol(surr#2)	53	P	2-Fluorobiphenyl(surr#4)	57	P
2,4,6-Tribromophenol(surr#5)	80	P	D14-Terphenyl(surr#6)	101	P
Pre Sampling Surrogates	% Recovery			% Recover	r <b>y</b>
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E =exceeded calib ND =not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	05/21/99
Sample Name:		Date Extracted:	06/04/99
Lab Sample ID:	• • • • • • • • • • • • • • • • • • • •	Date Acquired:	06/27/99
MS Data file:	S995043A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
1410011001	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	. 1

# Sample Description/Narrative:

#### 905211135SBF0 Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethylphathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	6
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND	• •	
<b>▼</b> ▲			

E =exceeded calib ND =not detected

 $J = Peak \cdot below the calibration range$ 

NS= not spiked

J

Project: O

Orimulsion

Date Sampled: 5/21/99

Sample Name:

905211135F

Date Extracted: 6/4/99

Lab Sample ID: MS Data file:

9905043

Date Acquired:

6/27/99 Bill Preston

Method:

S995043A 8270 Analyst: QC reviewer:

Dennis Tabor

HRGC/LRMS

Extract Volume

1 ml

Dilution Factor

1

#### Sample Description/Narrative:

905211135SBF0 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	9	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	05/21/99	
Sample Name:	905211135X	Date Extracted:	06/04/99	
Lab Sample ID:	9905044	Date Acquired:	06/27/99	
MS Data file:	S995044A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
Michiod.	HRGC/LRMS	Extract Volume	1	ml
	<del></del>	Dilution Factor	1	

### Sample Description/Narrative:

#### 905211135BX0 Filter

Pre Extraction Surrogates	% Recovery			% Recovery	y
2-Fluorophenol(surr#1)	56	P	D5-Nitrobenzene(surr#3)	63	P
D5-Phenol(surr#2)	57	P	2-Fluorobiphenyl(surr#4)	67	P
2,4,6-Tribromophenol(surr#5)	84	P	D14-Terphenyl(surr#6)	115	P
Pre Sampling Surrogates	% Recovery			% Recover	y
13C6-1,2 Dichlorobenzene	66		13C6-2,5 dichlorophenol	68	
13C6-Napthalene	67		13C6-2,5-Phthalate anhydride	57	
D10-Anthracene	82				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	5	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	2	J
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	6	J	n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	) ND	

Date Sampled: 05/21/99 Orimulsion Project: Date Extracted: 06/04/99 905211135X Sample Name: 06/27/99 Date Acquired: 9905044 Lab Sample ID: Analyst: Bill Preston MS Data file: S995044A QC reviewer: Dennis Tabor Method: 8270 Extract Volume 1 ml HRGC/LRMS 1 Dilution Factor

### Sample Description/Narrative:

#### 905211135BX0 Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethylphathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	4
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Project: Orimulsion
Sample Name: 905211135X
Lab Sample ID: 9905044
MS Data file: S995044A
Method: 8270

Date Extracted: 6/4/99
Date Acquired: 6/27/99
Analyst: Bill Preston

8270 QC reviewer: HRGC/LRMS Extract Volum

Dennis Tabor

5/21/99

Extract Volume
Dilution Factor

Date Sampled:

1 ml

1

### Sample Description/Narrative:

905211135BX0 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(C	CCC) ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)	anthracene ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Date Sampled: 05/21/99 Orimulsion Project: 06/04/99 Date Extracted: 905211135C Sample Name: Date Acquired: 06/27/99 9905045 Lab Sample ID: Analyst: Bill Preston MS Data file: S995045A QC reviewer: **Dennis Tabor** 8270 Method: ml Extract Volume 1 HRGC/LRMS Dilution Factor 1

#### Sample Description/Narrative:

#### 905211135SBI0 Condensate

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	•	P	D5-Nitrobenzene(surr#3)	59	P
D5-Phenol(surr#2)	<b>25</b>	P	2-Fluorobiphenyl(surr#4)	55	P
2,4,6-Tribromophenol(surr#5)	79	P	D14-Terphenyl(surr#6)	112	P
Pre Sampling Surrogates	% Recovery			% Recover	r <b>y</b>
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

05/21/99 Date Sampled: Project: Orimulsion 06/04/99 Sample Name: Date Extracted: 905211135C Date Acquired: 06/27/99 Lab Sample ID: 9905045 Bill Preston Analyst: MS Data file: S995045A Dennis Tabor QC reviewer: 8270 Method: Extract Volume 1 ml HRGC/LRMS **Dilution Factor** 1

#### Sample Description/Narrative:

#### 905211135SBI0 Condensate

μg	Compound	μg
ND	4-Chlorophenyl phenyl ether	ND
ND	2-Methyl-4,6-dinitrophenol	ND
ND	5-Nitro-o-toluidine	ND
ND	Diphenylamine	ND
ND	Diallate	ND
ND	1,3,5-Trinitrobenzene	ND
ND	4-Bromophenyl phenyl ether	ND
ND	Phenacetin	ND
ND	Hexachlorobenzene	ND
ND	4-Aminobiphenyl	ND
ND	Dinoseb	ND
ND	Pentachlorophenol(CCC)	ND
ND	Pentachloronitrobenzene	ND
ND	Phenanthrene	ND
ND	Anthracene	ND
ND	Di-n-butyl phthalate	ND
ND	Isodrin	ND
ND	Fluoranthene(CCC)	ND
ND	3,3'-Dimethylbenzidine	ND
ND	Pyrene	ND
ND	Chlorobenzilate	ND
ND	p-Dimethylaminoazobenzene	ND
ND	2-Acetylaminofluorene	ND
ND	Benzyl butyl phthalate	ND
ND	3,3'-Dichlorobenzidine	ND
ND	Benzo(a)anthracene	ND
ND		
	N N N N N N N N N N N N N N N N N N N	ND 4-Chlorophenyl phenyl ether ND 2-Methyl-4,6-dinitrophenol ND 5-Nitro-o-toluidine ND Diphenylamine ND Diallate ND 1,3,5-Trinitrobenzene ND 4-Bromophenyl phenyl ether ND Phenacetin ND Hexachlorobenzene ND 4-Aminobiphenyl ND Dinoseb ND Pentachlorophenol(CCC) ND Pentachloronitrobenzene ND Anthracene ND Anthracene ND Di-n-butyl phthalate ND Isodrin ND Fluoranthene(CCC) ND Pyrene ND Chlorobenzilate ND Pyrene ND Chlorobenzilate ND p-Dimethylaminoazobenzene ND Benzyl butyl phthalate ND Benzyl butyl phthalate ND Benzyl butyl phthalate ND Benzyl oanthracene

E = exceeded calib ND = not detected J = Peak below the calibration range NS= not spiked

Project:

Orimulsion

Date Sampled:

5/21/99

Sample Name:

905211135C

Date Extracted:

6/4/99

Lab Sample ID:

9905045

Date Acquired:

6/27/99

MS Data file:

S995045A

Analyst:

Bill Preston

Method:

8270

QC reviewer:

Dennis Tabor

HRGC/LRMS

Extract Volume

1 ml

**Dilution Factor** 

1

## Sample Description/Narrative:

905211135SBI0 Condensate

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
ND	3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND ND ND ND	ND Benzo(a)pyrene(CCC)  ND 3-Methylcholanthrene  ND Indeno(1,2,3-cd)pyrene  ND Dibenz(a,h)anthracene

05/24/99 Date Sampled: Orimulsion Project: 06/04/99 Date Extracted: Sample Name: 905241202F 06/27/99 Date Acquired: 9905046 Lab Sample ID: Bill Preston Analyst: S995046A MS Data file: QC reviewer: Dennis Tabor 8270 Method: ml **Extract Volume** 1 HRGC/LRMS

Dilution Factor 1

### Sample Description/Narrative:

#### 905241202SBFOBLO1 Filter

Pre Extraction Surrogates	% Recovery			% Recove	ery
2-Fluorophenol(surr#1)	51	P	D5-Nitrobenzene(surr#3)	59	P
D5-Phenol(surr#2)	60	P	2-Fluorobiphenyl(surr#4)	62	P
2,4,6-Tribromophenol(surr#5)	78	P	D14-Terphenyl(surr#6)	106	P
Pre Sampling Surrogates	% Recovery			% Recove	ery
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		N-nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	1	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project: Sample Name: Lab Sample ID: MS Data file: Method: Sample Descrip	Orimulsion 905241202F 9905046 S995046A 8270 HRGC/LRMS tion/Narrative:		Date Sampled: Date Extracted: Date Acquired: Analyst: QC reviewer: Extract Volume Dilution Factor	05/24/99 06/04/99 06/27/99 Bill Preston Dennis Tabor	1 ml 1	
905241202SBFO	BLO1 Filter			2		
Compound	i	μg	Compound		μg	
2-Methylnaphtha	alene	ND	4-Chlorophenyl	phenyl ether	ND	
Isosafrole		ND	2-Methyl-4,6-di	-	ND	
1,2,4,5-Tetrachle		ND	5-Nitro-o-toluid	ine	ND	
Hexachlorocycle	opentadiene(SPCC)	ND	Diphenylamine		ND	
2,4,6-Trichlorop	henol(CCC)	ND	Diallate		ND	
2,4,5-Trichlorop	henol	ND	1,3,5-Trinitrobe		ND	
2-Chloronaphtha	alene	ND	4-Bromophenyl	phenyl ether	ND	
1,3 Dinitrobenzo	ene	ND	Phenacetin		ND	
2-Nitroaniline		ND	Hexachlorobena	zene	ND	
3-Nitroaniline		ND	4-Aminobiphen	yl	ND	
Safrole		ND	Dinoseb		ND	
Acenaphthylene	<b>;</b>	ND	Pentachlorophe	nol(CCC)	ND	
1,4-Naphthoqui	none	ND	Pentachloronitre	obenzene	ND	
Dimethylphatha		ND	Phenanthrene		ND	
2,6-Dinitrotolue	ene	ND	Anthracene		ND	
Acenaphthene(		ND	Di-n-butyl phth	alate	8	J
1-Napthylamine		ND	Isodrin		ND	
2-Napthylamine		ND	Fluoranthene(C	CC)	ND	
4-Nitroaniline		ND	3,3'-Dimethylbe	enzidine	ND	
2,4-Dinitropher	nol(SPCC)	ND	Pyrene		ND	
Dibenzofuran		ND	Chlorobenzilate	•	ND	
Pentachloroben	zene	ND	p-Dimethylami	noazobenzene	ND	
2,4-Dinitrotolu	ene	ND	2-Acetylamino	fluorene	ND	
2,3,4,6-Tetrach	lorophenol	ND	Benzyl butyl pl	nthalate	ND	
4-Nitrophenol(	SPCC)	ND	3,3'-Dichlorobe	enzidine	ND	
Fluorene		ND	Benzo(a)anthra	cene	ND	
Diethyl phathal	ate	5	J			

ND = not detected

E = exceeded calib

J = Peak below the calibration range

Date Sampled: 5/24/99 Orimulsion Project: Date Extracted: Sample Name: 905241202F 6/4/99 Date Acquired: 6/27/99 Lab Sample ID: 9905046 Bill Preston S995046A Analyst: MS Data file: Method:

8270 QC reviewer: Dennis Tabor HRGC/LRMS Extract Volume

Dilution Factor 1

#### **Sample Description/Narrative:**

#### 905241202SBFOBLO1 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

1 ml

Project:	Orimulsion	Date Sampled:	05/24/99	
Sample Name:	905241202X	Date Extracted:	06/04/99	
Lab Sample ID:	9905047	Date Acquired:	06/28/99	
MS Data file:	S995047A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### **Sample Description/Narrative:**

#### 905241202SBW2BLO1-XAD

Pre Extraction Surrogates	% Recovery			% Recover	•v
2-Fluorophenol(surr#1)	% Recovery	P	D5-Nitrobenzene(surr#3)	63	· <b>y</b> P
D5-Phenol(surr#2)	. 59	P	2-Fluorobiphenyl(surr#4)	64	P
2,4,6-Tribromophenol(surr#5)	. 37 78	P	D14-Terphenyl(surr#6)	98	P
2,4,0-1110101110phenol(surr#3)	70	•	D14-10(phonyl(sutt#0)	70	•
Pre Sampling Surrogates	% Recovery			% Recover	ту
13C6-1,2 Dichlorobenzene	64		13C6-2,5 dichlorophenol	71	
13C6-Napthalene	66		13C6-2,5-Phthalate anhydride	116	
D10-Anthracene	72				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND				
Methyl Methanesulfonate	ND		4-methylphenol	ND	
n-Nitrosodiethylamine	ND		N-nitrosodi-n-propylamine	ND	
bis (2-chloroethyl) ether	ND		Nitrobenzene	ND	
Ethyl methanesulfonate	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	3	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	1	J
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	5	J	n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

# APPCD Organic Support Laboratory

## **Semi-Volatile Organics Report**

Project:	Orimulsion	Date Sampled:	05/24/99
Sample Name:	905241202X	Date Extracted:	06/04/99
Lab Sample ID:		Date Acquired:	06/28/99
MS Data file:	S995047A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml
Sample Descrip	tion/Narrative:	Dilution Factor	1

#### 905241202SBW2BLO1-XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	9
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib N

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Project:

Orimulsion

Date Sampled: 05/24/99

Sample Name:

905241202X

Date Extracted: 06/04/99

Lab Sample ID:

9905047

Date Acquired:

06/28/99

MS Data file: Method:

S995047A

Analyst:

Bill Preston

8270 HRGC/LRMS QC reviewer: **Extract Volume**  Dennis Tabor

1 ml

**Dilution Factor** 

1

### Sample Description/Narrative:

905241202SBW2BLO1-XAD

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project: Sample Name: Orimulsion

905241202C

Lab Sample ID: MS Data file:

9905048

Method:

S995048A 8270

HRGC/LRMS

Date Sampled:

05/24/99

Date Extracted:

Date Acquired:

06/07/99

Analyst:

06/28/99

Bill Preston

QC reviewer:

Dennis Tabor

**Extract Volume** 

1 ml

**Dilution Factor** 

1

#### Sample Description/Narrative:

#### 905241202SBIOBLO1 Condensates

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	36	P	D5-Nitrobenzene(surr#3)	56	P
D5-Phenol(surr#2)	31	P	2-Fluorobiphenyl(surr#4)	55	P
2,4,6-Tribromophenol(surr#5)	78	P	D14-Terphenyl(surr#6)	118	P
Pre Sampling Surrogates	% Recovery	,		% Recover	y
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 dichlorophenol	NS	
13C6-Nanthalene	NS		13C6-2,5-Phthalate anhydride	NS	

13Co-Napthalene	149	15C0-2,5-Filulatate attityuride	140
D10-Anthracene	NS		
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND		
Methyl Methanesulfonate	ND	4-methylphenol	ND
n-Nitrosodiethylamine	ND	N-nitrosodi-n-propylamine	ND
bis (2-chloroethyl) ether	ND	Nitrobenzene	ND
Ethyl methanesulfonate	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	ND	Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	ND
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	ND	n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project: Sample Name: Lab Sample ID: MS Data file: Method: Sample Descrip	S995048A 8270 HRGC/LRMS	Date Sampled: Date Extracted: Date Acquired: Analyst: QC reviewer: Extract Volume Dilution Factor	
Sample Descrip	HOIMMALLAUNE:	Dilution Pactor	•

### 905241202SBIOBLO1 Condensates

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		
<b>₹ ±</b>			

E =exceeded calib ND =not detected

J = Peak below the calibration range

Date Sampled: 05/24/99 Orimulsion Project: 06/07/99 Date Extracted: 905241202C Sample Name: Date Acquired: 06/28/99 Lab Sample ID: 9905048 Analyst: **Bill Preston** MS Data file: S995048A **Dennis Tabor** 8270 QC reviewer: Method: Extract Volume 1 ml HRGC/LRMS Dilution Factor

Sample Description/Narrative:

905241202SBIOBLO1 Condensates

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
ND	3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND ND ND ND	ND Benzo(a)pyrene(CCC) ND 3-Methylcholanthrene ND Indeno(1,2,3-cd)pyrene ND Dibenz(a,h)anthracene

Project:	Orimulsion	Date Sampled:	05/25/99	
Sample Name:	905251144F	Date Extracted:	06/04/99	
Lab Sample ID:	9905058	Date Acquired:	06/28/99	
MS Data file:	S995058A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

#### 905251144SBF0BLO1 Filter

905251144SBF0BLO1 Filter					
Pre Extraction Surrogates	% Recovery	,		% Recover	ry
2-Fluorophenol(surr#1)	50	P	D5-Nitrobenzene(surr#3)	59	P
D5-Phenol(surr#2)	62	P	2-Fluorobiphenyl(surr#4)	61	P
2,4,6-Tribromophenol(surr#5)	75	P	D14-Terphenyl(surr#6)	106	P
Pre Sampling Surrogates	% Recovery	y		% Recover	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND				
Methyl Methanesulfonate	ND		4-methylphenol	ND	
n-Nitrosodiethylamine	ND		N-nitrosodi-n-propylamine	ND	
bis (2-chloroethyl) ether	ND		Nitrobenzene	ND	
Ethyl methanesulfonate	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected

J = Peak below the calibration range

Project: Sample Name: Lab Sample ID: MS Data file: Method: Sample Descrip	S95058A 8270 HRGC/LRMS	Date Sampled: Date Extracted: Date Acquired: Analyst: QC reviewer: Extract Volume Dilution Factor	
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### 905251144SBF0BLO1 Filter

Compound	μg	Compound	μg ND
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2.6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	11
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	11		
Diethyl phathalate	11		

E =exceeded calib ND =not detected

J = Peak below the calibration range

Project:

Orimulsion

Date Sampled:

05/25/99

Sample Name:

905251144F

Date Extracted: 06/04/99

Lab Sample ID:

990\$058 S99\$058A Date Acquired:

06/28/99

MS Data file: Method:

8270

Analyst: QC reviewer: **Bill Preston** 

HR&C/LRMS

**Extract Volume** 

Dennis Tabor 1 ml

Dilution Factor

1

#### **Sample Description/Narrative:**

#### 905251144SBF0BLO1 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	3	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project: Orimusion Date Sampled. 03/23/99	
Sample Name: 905251144X Date Extracted: 06/04/99	
Lab Sample ID: 9905059 Date Acquired: 06/28/99	
MS Data file: S995059A Analyst: Bill Preston	
Method: 8270 QC reviewer: Dennis Tabor	
	nl
Dilution Factor 1	

## Sample Description/Narrative:

### 905251144SBXOBL01-XAD

905251144SBAOBLUI-AAD					
Pre Extraction Surrogates	% Recovery			% Recover	<b>y</b>
2-Fluorophenol(surr#1)	55	P	D5-Nitrobenzene(surr#3)	61	P
D5-Phenol(surr#2)	60	P	2-Fluorobiphenyl(surr#4)	65	P
2,4,6-Tribromophenol(surr#5)	90	P	D14-Terphenyl(surr#6)	114	P
Pre Sampling Surrogates	% Recovery	,		% Recover	ry
13C6-1,2 Dichlorobenzene	61		13C6-2,5 Dichlorophenol	64	
13C6-Napthalene	64		13C6-2,5-Phthalate anhydride	97	
D10-Anthracene	86				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND				
Methyl Methanesulfonate	ND		4-Methylphenol	ND	
n-Nitrosodiethylamine	ND		N-nitrosodi-n-propylamine	ND	
bis (2-chloroethyl) ether	ND		Nitrobenzene	ND	
Ethyl methanesulfonate	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	3	]	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1.3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	5		J n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	) ND	

E = exceeded calib ND = not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	05/25/99
Sample Name:	905251144X	Date Extracted:	06/04/99
Lab Sample ID:	9905059	Date Acquired:	06/28/99
MS Data file:	S995059A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml
Sample Descrip	tion/Narrative:	Dilution Factor	1

#### 905251144SBXOBL01-XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	3
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2.4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		
· -			

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Date Sampled: 05/25/99 Orimulsion Project: Date Extracted: 06/04/99 Sample Name: 905251144X Date Acquired: Lab Sample ID: 06/28/99 9905059 MS Data file: S995059A Analyst: **Bill Preston** 8270 QC reviewer: Dennis Tabor Method:

HRGC/LRMS Extract Volume 1 ml

Dilution Factor 1

#### **Sample Description/Narrative:**

#### 905251144SBXOBL01-XAD

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	1	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Date Sampled: 05/25/99 Orimulsion Project: Date Extracted: 06/07/99 Sample Name: 90251144C Date Acquired: 06/28/99 Lab Sample ID: 9905060 \$995060A Analyst: Bill Preston MS Data file: Dennis Tabor 8270 QC reviewer: Method: Extract Volume HRGC/LRMS 1 ml

Dilution Factor 1

#### Sample Description/Narrative:

#### 90251144SBIOBL01 Condensate

Pre Extraction Surrogates	% Recovery		% Recovery
2-Fluorophenol(surr#1)	39 P	D5-Nitrobenzene(surr#3)	61 P
D5-Phenol(surr#2)	35 P	2-Fluorobiphenyl(surr#4)	59 P
2,4,6-Tribromophenol(surr#5)	77 P	D14-Terphenyl(surr#6)	127 P
Pre Sampling Surrogates	% Recovery		% Recovery
13C6-1,2 Dichlorobenzene	NS	13C6-2,5 Dichlorophenol	NS
13C6-Napthalene	NS	13C6-2,5-Phthalate anhydride	NS
D10-Anthracene	NS		
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND	4-Methylphenol	ND
Methyl Methanesulfonate	ND	n-Nitrosodi-n-propylamine	ND
n-Nitrosodiethylamine	ND	Nitrobenzene	ND
bis (2-chloroethyl) ether	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	ND	Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	ND
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND .
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	ND	n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Date Sampled: 5/19/99 Orimulsion Project: Date Extracted: 6/1/99 Sample Name: 905191016X Date Acquired: 6/26/99 9905033 Lab Sample ID: Analyst: Bill Preston MS Data file: S995033A Dennis Tabor QC reviewer: 8270 Method:

Extract Volume 1 ml HRGC/LRMS

**Dilution Factor** 

1

### Sample Description/Narrative:

#### 905191016SBX0 XAD

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
3	J 3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND 3 ND ND	ND Benzo(a)pyrene(CCC)  3 J 3-Methylcholanthrene  ND Indeno(1,2,3-cd)pyrene  ND Dibenz(a,h)anthracene

Project:	Orimulsion		Date Sampled:	05/25/99		
Sample Name:	90251144C		Date Extracted:	06/07/99		
Lab Sample ID:	9905060		Date Acquired:	06/28/99		
MS Data file:	S995060A		Analyst:	Bill Preston		
Method:	8270		QC reviewer:	Dennis Tabor	ı	
11201120 41	HRGC/LRMS		Extract Volume		1 ml	
Sample Descrip	tion/Narrative:		Dilution Factor		1	
90251144SBIOBI	L01 Condensate					
Compound		μg	Compound			μg
2-Methylnaphth	alene	ND	4-Chlorophenyl	phenyl ether		ND
Isosafrole		ND	2-Methyl-4,6-di	nitrophenol		ND
1,2,4,5-Tetrachl	orobenzene	ND	5-Nitro-o-toluid	line		ND
Hexachlorocycle	opentadiene(SPCC)	ND	Diphenylamine			ND
2,4,6-Trichlorop	ohenol(CCC)	ND	Diallate			ND
2,4,5-Trichlorop	ohenol	ND	1,3,5-Trinitrobe	enzene		ND
2-Chloronaphth	alene	ND	4-Bromophenyl	phenyl ether		ND
1,3 Dinitrobenz	ene	ND	Phenacetin			ND
2-Nitroaniline		ND	Hexachloroben	zene		ND
3-Nitroaniline		ND	4-Aminobiphen	ıyl		ND
Safrole		ND	Dinoseb			ND
Acenaphthylene	<b>&gt;</b> .	ND	Pentachlorophe	nol(CCC)		ND
1,4-Naphthoqui	none	ND	Pentachloronitr	obenzene		ND
Dimethyl phath	alate	ND	Phenanthrene			ND
2,6-Dinitrotolu	ene	ND	Anthracene			ND
Acenaphthene(	CCC)	ND	Di-n-butyl phth	alate		ND
1-Napthylamin	e	ND	Isodrin			ND
2-Napthylamin	e	ND	Fluoranthene(C	CCC)		ND
4-Nitroaniline		ND	3,3'-Dimethylb	enzidine		ND
2,4-Dinitropher	nol(SPCC)	ND	Pyrene			ND
Dibenzofuran		ND	Chlorobenzilat	e		ND
Pentachloroben	nzene	ND	p-Dimethylami	inoazobenzene	;	ND
2,4-Dinitrotolu	ene	ND	2-Acetylamino			ND
2,3,4,6-Tetrach	lorophenol	ND	Benzyl butyl pl			ND
4-Nitrophenol(	SPCC)	ND	3,3'-Dichlorobo			ND
Fluorene		ND	Benzo(a)anthra	acene		ND
	•					

E = exceeded calib

Diethyl phathalate

ND = not detected

J = Peak below the calibration range

ND

Project:

Orimulsion

Date Sampled:

05/25/99

Sample Name:

90251144C

Date Extracted:

06/07/99 Date Acquired: 06/28/99

Lab Sample ID: MS Data file:

9905060 S995060A

Analyst:

**Bill Preston** 

Method:

8270 HRGC/LRMS QC reviewer: **Extract Volume**  Dennis Tabor

Dilution Factor

1

1 ml

#### **Sample Description/Narrative:**

90251144SBIOBL01 Condensate

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project: Sample Name: Lab Sample ID:	Orimulsion	Date Sampled:	05/26/99	
	905261054F	Date Extracted:	06/09/99	
	9905061	Date Acquired:	06/28/99	
MS Data file:	S995061A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
14104110	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

### 905261054SBFOBL01 Filter

Pre Extraction Surrogates	% Recovery			% Recover	·y
2-Fluorophenol(surr#1)	49	P	D5-Nitrobenzene(surr#3)	56	P
D5-Phenol(surr#2)	62	P	2-Fluorobiphenyl(surr#4)	62	P
2,4,6-Tribromophenol(surr#5)	83	P	D14-Terphenyl(surr#6)	117	P
Pre Sampling Surrogates	% Recovery			% Recover	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	2	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E =exceeded calib ND =not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	05/26/99
Sample Name:	905261054F	Date Extracted:	06/09/99
Lab Sample ID:	9905061	Date Acquired:	06/28/99
MS Data file:	\$995061A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml
Sample Descrip	tion/Narrative:	Dilution Factor	1

#### 905261054SBFOBL01 Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	8
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4.6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	3	J	

E = exceeded calib ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Date Sampled: Project: Orimulsion 05/26/99 Date Extracted: 06/09/99 Sample Name: 905261054F Date Acquired: Lab Sample ID: 9905061 06/28/99 MS Data file: Analyst: S995061A **Bill Preston** Method: 8270 QC reviewer: **Dennis Tabor** HRGC/LRMS **Extract Volume** 

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

.. ..

# Sample Description/Narrative:

#### 905261054SBFOBL01 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	05/26/99	
Sample Name:	905261054X	Date Extracted:	06/09/99	
Lab Sample ID:	9905062	Date Acquired:	06/28/99	
MS Data file:	\$995062A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

#### 905261054SBXOBL01 XAD

9032010343BAOBLOI AAD					
Pre Extraction Surrogates	% Recovery	7		% Recover	rv
2-Fluorophenol(suri#1)	41	P	D5-Nitrobenzene(surr#3)	56	P
D5-Phenol(surr#2)	53	P	2-Fluorobiphenyl(surr#4)	67	P
2,4,6-Tribromophenol(surr#5)	94	P	D14-Terphenyl(surr#6)	120	P
Pre Sampling Surrogates	% Recovery	y		% Recover	ry
13C6-1,2 Dichlorobenzene	46		13C6-2,5 Dichlorophenol	61	
13C6-Napthalene	55		13C6-2,5-Phthalate anhydride	218	
D10-Anthracene	75				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine .	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND:	
Phenol(CCC)	3	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	5	J	n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Orimulsion Date Sampled: 05/26/99 Project: Date Extracted: 06/09/99 905261054X Sample Name: Date Acquired: 06/28/99 Lab Sample ID: 9905062 Analyst: Bill Preston MS Data file: S995062A Dennis Tabor QC reviewer: 8270 Method: 1 ml **Extract Volume** HRGC/LRMS Sample Description/Narrative: 1 **Dilution Factor** 

#### 905261054SBXOBL01 XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	20
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	1
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E =exceeded calib ND =not detected

J = Peak below the calibration range

NS= not spiked

J

Project:

Orimulsion

Date Sampled:

05/26/99

Sample Name:

905261054X

Date Extracted:

06/09/99

Lab Sample ID:

9905062

Date Acquired:

06/28/99

MS Data file:

\$995062A

Analyst:

Bill Preston

Method:

**\$**270

QC reviewer:

Dennis Tabor

HRGC/LRMS

Extract Volume
Dilution Factor

1 ml

1

#### Sample Description/Narrative:

905261054SBXOBL01 XAD

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

05/26/99 Orimulsion Date Sampled: Project: Date Extracted: 06/07/99 905261054C Sample Name: Date Acquired: 06/28/99 9905063 Lab Sample ID: Analyst: Bill Preston \$995063A MS Data file: QC reviewer: Dennis Tabor 8270 Method: **Extract Volume** 1 ml HRGC/LRMS 1 Dilution Factor

#### Sample Description/Narrative:

#### 905261054SBIOBL01 Condensate

Pre Extraction Surrogates	% Recovery			% Recover	ry
2-Fluorophenol(surr#1)	•	P	D5-Nitrobenzene(surr#3)	62	P
D5-Phenol(surr#2)	34	P	2-Fluorobiphenyl(surr#4)	60	P
2,4,6-Tribromophenol(surr#5)	77	P	D14-Terphenyl(surr#6)	108	P
Pre Sampling Surrogates	% Recovery			% Recover	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project: Sample Name: Lab Sample ID: MS Data file: Method: Sample Descrip	Orimulsion 905261054C 9905063 S995063A 8270 HRGC/LRMS		Date Sampled: Date Extracted: Date Acquired: Analyst: QC reviewer: Extract Volume Dilution Factor	05/26/99 06/07/99 06/28/99 Bill Preston Dennis Tabor	1 ml 1	
905261054SBIOE	BL01 Condensate					
Compound		μg	Compound			μg
2-Methylnaphtha	alene	ND	4-Chlorophenyl	phenyl ether		ND
Isosafrole		ND	2-Methyl-4,6-di	nitrophenol		ND
1,2,4,5-Tetrachle	orobenzene	ND	5-Nitro-o-toluid	line		ND
Hexachlorocycle	opentadiene(SPCC)	ND	Diphenylamine			ND
2,4,6-Trichlorop	henol(CCC)	ND	Diallate			ND
2,4,5-Trichlorop	henol	ND	1,3,5-Trinitrobe	nzene		ND
2-Chloronaphtha	alene	ND	4-Bromophenyl	phenyl ether		ND
1,3 Dinitrobenzo	ene	ND	Phenacetin			ND
2-Nitroaniline		ND	Hexachlorobenz	zene		ND
3-Nitroaniline		ND	4-Aminobiphen	yl		ND
Safrole		ND	Dinoseb			ND
Acenaphthylene	}	ND	Pentachlorophe	nol(CCC)		ND
1,4-Naphthoqui	none	ND	Pentachloronitre	obenzene		ND
Dimethyl phatha	alate	ND	Phenanthrene			ND
2,6-Dinitrotolue	ene	ND	Anthracene			ND
Acenaphthene(C	CCC)	ND	Di-n-butyl phth	alate		ND
1-Napthylamine		ND	Isodrin			ND
2-Napthylamine	·	ND	Fluoranthene(C	CC)		ND
4-Nitroaniline		ND	3,3'-Dimethylbe	enzidine		ND
2,4-Dinitrophen	ol(SPCC)	ND	Pyrene			ND
Dibenzofuran		ND	Chlorobenzilate			ND
Pentachloroben		ND	p-Dimethylamin			ND
2,4-Dinitrotolue		ND	2-Acetylaminof			ND
2,3,4,6-Tetrachl	•	ND	Benzyl butyl ph			ND
4-Nitrophenol(S	SPCC)	ND	3,3'-Dichlorobe			ND
Fluorene		ND	Benzo(a)anthra	cene		ND
Diethyl phathal	ate	ND				

Project: Orimulsion Sample Name: Lab Sample ID:

905261054C 9905063

MS Data file: Method:

\$995063A 8270

HRGC/LRMS

Date Sampled:

05/26/99

Date Extracted: 06/07/99 Date Acquired:

06/28/99 Bill Preston

Analyst: QC reviewer:

**Dennis Tabor** 

**Extract Volume** 

1 ml

**Dilution Factor** 

1

#### Sample Description/Narrative:

#### 905261054SBIOBL01 Condensate

μg	Compound	μg
ND	Benzo(a)pyrene(CCC)	ND
ND	3-Methylcholanthrene	ND
ND	Indeno(1,2,3-cd)pyrene	ND
ND	Dibenz(a,h)anthracene	ND
ND	Benzo(ghi)perylene	ND
	ND ND ND ND	ND Benzo(a)pyrene(CCC) ND 3-Methylcholanthrene ND Indeno(1,2,3-cd)pyrene ND Dibenz(a,h)anthracene

NA Project: Orimulsion Date Sampled: Date Extracted: Sample Name: Glassware Blank 06/01/99 Lab Sample ID: Date Acquired: 06/28/99 9906001 Bill Preston MS Data file: S996001A Analyst: 8270 QC reviewer: **Dennis Tabor** Method: Extract Volume 1 HRGC/LRMS ml 1 **Dilution Factor** 

#### Sample Description/Narrative:

#### Glassware Blank

Pre Extraction Surrogates	% Recovery			% Recovery	,
2-Fluorophenol(surr#1)	71 1	P	D5-Nitrobenzene(surr#3)	79	P
D5-Phenol(surr#2)	80 1	P	2-Fluorobiphenyl(surr#4)	76	P
2,4,6-Tribromophenol(surr#5)	90 1	P	D14-Terphenyl(surr#6)	118	P
Pre Sampling Surrogates	% Recovery			% Recovery	,
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	
E = exceeded calib $ND =$ not detected	J = Peak below t	the	calibration range		

Orimulsion Project: Date Sampled: NA Sample Name: Glassware Blank Date Extracted: 06/01/99 Lab Sample ID: 9906001 Date Acquired: 06/28/99 S996001A MS Data file: Analyst: Bill Preston 8270 **Dennis Tabor** Method: QC reviewer: HRGC/LRMS Extract Volume 1 ml 1 **Dilution Factor** 

#### Sample Description/Narrative:

#### Glassware Blank

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	11
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project:

Orimulsion

Sample Name:

Glassware Blank

Lab Sample ID: MS Data file:

9906001

Method:

S996001A 8270

HRGC/LRMS

Date Sampled:

Date Extracted: 06/01/99

Date Acquired:

06/28/99 Bill Preston

NA

QC reviewer:

Analyst:

**Dennis Tabor** 

Extract Volume

Dilution Factor

1 ml 1

Sample Description/Narrative:

Glassware Blank

Compound

μg

ND

ND

ND

ND

ND

Compound

μg

ND

ND

ND

Chrysene di-n-Octyl phthalate(CCC) Benzo(b)fluoranthene

7,12-Dimethylbenz(a)anthracene

Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene

ND

Benzo(k)fluoranthene

Benzo(ghi)perylene

Benzo(a)pyrene(CCC)

3-Methylcholanthrene

ND

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	06/03/99	
Sample Name:	906031216F	Date Extracted:	06/09/99	
Lab Sample ID:	9906007	Date Acquired:	06/28/99	
MS Data file:	S996007A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 906031216SBFOBLR6 Filter

7000312105B1					
Pre Extraction Surrogates	% Recovery			% Recover	<b>Y</b>
2-Fluorophenol(surr#1)	42	P	D5-Nitrobenzene(surr#3)	56	P
D5-Phenol(surr#2)	56	P	2-Fluorobiphenyl(surr#4)	68	P
2,4,6-Tribromophenol(surr#5)	85	P	D14-Terphenyl(surr#6)	116	P
Pre Sampling Surrogates	% Recovery			% Recover	<b>y</b>
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

06/03/99 Date Sampled: Orimulsion Project: Date Extracted: 06/09/99 906031216F Sample Name: 06/28/99 Date Acquired: Lab Sample ID: 9906007 Bill Preston S\$96007A Analyst: MS Data file: Dennis Tabor QC reviewer: 8270 Method: 1 ml Extract Volume HRGC/LRMS 1 Dilution Factor

### Sample Description/Narrative:

#### 906031216SBFOBLR6 Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	10
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		
• •			

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Project:

Orimulsion

Sample Name: Lab Sample ID: 906031216F

9906007

Date Sampled: Date Extracted:

06/03/99 06/09/99

MS Data file:

S996007A

Date Acquired:

06/28/99

Method:

8270

Analyst:

**Bill Preston** 

HRGC/LRMS

QC reviewer:

Dennis Tabor

**Extract Volume** 

1 ml

Sample Description/Narrative:

Dilution Factor

1

#### 906031216SBFOBLR6 Filter

Compound
----------

μg

ND

ND

μg

ND

Chrysene
di-n-Octyl phthalate(CCC)
Benzo(b)fluoranthene

7,12-Dimethylbenz(a)anthracene Benzo(k)fluoranthene

J 3-Methylcholanthrene 2 Indeno(1,2,3-cd)pyrene ND Dibenz(a,h)anthracene ND Benzo(ghi)perylene

Benzo(a)pyrene(CCC)

ND ND ND

ND

Project: Orimulsion Sample Name: 906031216X Lab Sample ID: 9906008 MS Data file: S996008A Method: 8270 HRGC/LRMS	Date Sampled: Date Extracted: Date Acquired: Analyst: QC reviewer: Extract Volume Dilution Factor	06/03/99 06/09/99 06/28/99 Bill Preston Dennis Tabor 1	ml
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### Sample Description/Narrative:

#### 906031216SBXOBLR6 - XAD

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	48	P	D5-Nitrobenzene(surr#3)	60	P
D5-Phenol(surr#2)	58	P	2-Fluorobiphenyl(surr#4)	66	P
2,4,6-Tribromophenol(surr#5)	85	P	D14-Terphenyl(surr#6)	108	P
Pre Sampling Surrogates	% Recovery			% Recover	y
13C6-1,2 Dichlorobenzene	49		13C6-2,5 Dichlorophenol	58	
13C6-Napthalene	54		13C6-2,5-Phthalate anhydride	185	
D10-Anthracene	73				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	4		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	2	J
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	5		J n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	06/03/99
Sample Name:	906031216X	Date Extracted:	06/09/99
Lab Sample ID:	9906008	Date Acquired:	06/28/99
MS Data file:	\$996008A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml

Dilution Factor

#### Sample Description/Narrative:

#### 906031216SBXOBLR6 - XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND ·	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	13
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	2	1	

E =exceeded calib ND =not detected

J = Peak below the calibration range

Date Sampled: 06/03/99 Orimulsion Project: Sample Name: 906031216X Date Extracted: 06/09/99 Date Acquired: Lab Sample ID: 06/28/99 9906008 Analyst: Bill Preston MS Data file: S996008A Dennis Tabor QC reviewer: 8270 Method:

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

### Sample Description/Narrative:

906031216SBXOBLR6 - XAD

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Orimulsion	Date Sampled:	06/03/99	
	Date Extracted:	06/07/99	
	Date Acquired:	06/29/99	
	Analyst:	Bill Preston	
8270	QC reviewer:	Dennis Tabor	
HRGC/LRMS	Extract Volume	1	ml
	Dilution Factor	1	
		906031216C Date Extracted: 9906009 Date Acquired: S996009B Analyst: 8270 QC reviewer: HRGC/LRMS Extract Volume	906031216C         Date Extracted:         06/07/99           9906009         Date Acquired:         06/29/99           \$996009B         Analyst:         Bill Preston           8270         QC reviewer:         Dennis Tabor           HRGC/LRMS         Extract Volume         1

## Sample Description/Narrative:

## 906031216SBFOBLR6-Condensate

Pre Extraction Surrogates	% Recovery			% Recovery	_
2-Fluorophenol(surr#1)	30	P	D5-Nitrobenzene(surr#3)	45 P	
D5-Phenol(surr#2)	25	P	2-Fluorobiphenyl(surr#4)	42 F	
2,4,6-Tribromophenol(surr#5)	57	P	D14-Terphenyl(surr#6)	83 F	<b>د</b>
Pre Sampling Surrogates	% Recovery	,		% Recovery	
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
	NS		13C6-2,5-Phthalate anhydride	NS	
13C6-Napthalene D10-Anthracene	NS		·		
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1.4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
	ND		4-Chloroaniline	ND	
2-Methylphenol	ND		Hexachlorobutadiene(CCC)	ND	
n-Nitrosospyrrolidine	ND		n-Nitrosodi-n-butylamine	ND	
Acetophenone Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC	) ND	

Project:	Orimulsion	Date Sampled:	06/03/99
Sample Name:	906031216C	Date Extracted:	06/07/99
Lab Sample ID:		Date Acquired:	06/29/99
MS Data file:	S996009B	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
11200110	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

## Sample Description/Narrative:

#### 906031216SBFOBLR6-Condensate

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND .	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		
· · · · · · · · · · · · · · · · · · ·			

Date Sampled: 06/03/99 Orimulsion Project: Date Extracted: 06/07/99 Sample Name: 906031216C Date Acquired: 06/29/99 Lab Sample ID: 9906009 Analyst: **Bill Preston** MS Data file: \$996009B **Dennis Tabor** 8270 QC reviewer: Method:

1 ml **HRGC/LRMS Extract Volume** 

Dilution Factor

1

#### **Sample Description/Narrative:**

#### 906031216SBFOBLR6-Condensate

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	1	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Date Sampled: 06/04/99 Project: Orimulsion Date Extracted: 06/09/99 906041304F Sample Name: Date Acquired: 06/29/99 9906019 Lab Sample ID: Analyst: Bill Preston MS Data file: S996019B Dennis Tabor QC reviewer: Method: 8270 Extract Volume 1 HRGC/LRMS

Dilution Factor 1

ml

#### Sample Description/Narrative:

#### 906041304SBFOBLR6 Filter

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	42	P	D5-Nitrobenzene(surr#3)	59	P
D5-Phenol(surr#2)	57	P	2-Fluorobiphenyl(surr#4)	65	P
2,4,6-Tribromophenol(surr#5)	75	P	D14-Terphenyl(surr#6)	105	P
Pre Sampling Surrogates	% Recovery			% Recover	y
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Date Sampled: 06/04/99 Project: Orimulsion Date Extracted: 06/09/99 Sample Name: 906041304F Date Acquired: 06/29/99 Lab Sample ID: 9906019 Bill Preston Analyst: MS Data file: S996019B QC reviewer: **Dennis Tabor** 8270 Method: 1 ml **Extract Volume** HRGC/LRMS **Dilution Factor** 

#### Sample Description/Narrative:

#### 906041304SBFOBLR6 Filter

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	40
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	2	J	

E =exceeded calib ND =not detected J =Peak belo

J = Peak below the calibration range

Date Sampled: 06/04/99 Orimulsion Project: Date Extracted: 06/09/99 906041304F Sample Name: Date Acquired: Lab Sample ID: 06/29/99 9906019 Bill Preston Analyst: MS Data file: S996019B QC reviewer: **Dennis Tabor** 8270 Method:

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

#### Sample Description/Narrative:

#### 906041304SBFOBLR6 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	9	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

## APPCD Organic Support Laboratory

## Semi-Volatile Organics Report

Date Sampled: 06/04/99 Orimulsion Project: 06/09/99 Date Extracted: 906041304X Sample Name: Date Acquired: 06/29/99 9906020 Lab Sample ID: Analyst: Bill Preston S996020B MS Data file: Dennis Tabor QC reviewer: 8270 Method: 1 ml **Extract Volume** HRGC/LRMS 1 **Dilution Factor** 

Sample Description/Narrative:

#### 906041304SBXOBLR6 XAD

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	48	P	D5-Nitrobenzene(surr#3)	65	P
D5-Phenol(surr#2)	62	P	2-Fluorobiphenyl(surr#4)	71	P
2,4,6-Tribromophenol(surr#5)	91	P	D14-Terphenyl(surr#6)	123	P
Pre Sampling Surrogates	% Recovery			% Recover	y
13C6-1,2 Dichlorobenzene	53		13C6-2,5 Dichlorophenol	63	
13C6-Napthalene	61		13C6-2,5-Phthalate anhydride	45	
D10-Anthracene	73				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	3	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	4		J n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	06/04/99
Sample Name:	906041304X	Date Extracted:	06/09/99
Lab Sample ID:	9906020	Date Acquired:	06/29/99
MS Data file:	\$996020B	Analyst:	Bill Preston
Method:	<b>\$</b> 270	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml

Dilution Factor

1

J

#### Sample Description/Narrative:

#### 906041304SBXOBLR6 XAD

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	5
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

Date Sampled: 06/04/99 Orimulsion Project: Date Extracted: 06/09/99 906041304X Sample Name: Date Acquired: 06/29/99 Lab Sample ID: 9906020 Analyst: **Bill Preston** MS Data file: \$996020B Dennis Tabor QC reviewer: 8270 Method:

Extract Volume HRGC/LRMS

1 ml

Dilution Factor

1

#### Sample Description/Narrative:

#### 906041304SBXOBLR6 XAD

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	1	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:
Sample Name:
Lab Sample ID:
MS Data file:

Method:

Orimulsion 906041304C

9906021 \$996021B 8270

HRGC/LRMS

Date Sampled: 06/04/99
Date Extracted: 06/15/99
Date Acquired: 06/29/99
Analyst: Bill Preston

Analyst: Bill
QC reviewer: Der
Extract Volume

Dennis Tabor

1 ml

Dilution Factor 1

#### Sample Description/Narrative:

#### 906041304SBIOBLR6 Condensate

Pre Extraction Surrogates	% Recovery	,		% Recover	ry
2-Fluorophenol(surr#1)	51	P	D5-Nitrobenzene(surr#3)	74	P
D5-Phenol(surr#2)	46	P	2-Fluorobiphenyl(surr#4)	74	P
2,4,6-Tribromophenol(surr#5)	98	P	D14-Terphenyl(surr#6)	131	P
Pre Sampling Surrogates	% Recovery	7		% Recover	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Date Sampled: 06/04/99 Orimulsion Project: Date Extracted: 06/15/99 906041304C Sample Name: Date Acquired: 06/29/99 9906021 Lab Sample ID: Bill Preston Analyst: S996021B MS Data file: **Dennis Tabor** QC reviewer: 8270 Method: 1 ml Extract Volume HRGC/LRMS 1 **Dilution Factor** 

#### Sample Description/Narrative:

#### 906041304SBIOBLR6 Condensate

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

E = exceeded calib ND = not detected

i

J = Peak below the calibration range

Date Sampled: Orimulsion 06/04/99 Project: 906041304C Date Extracted: 06/15/99 Sample Name: Date Acquired: 06/29/99 9906021 Lab Sample ID: **Bill Preston** MS Data file: S996021B Analyst: Dennis Tabor 8270 QC reviewer: Method:

HRGC/LRMS **Extract Volume** 1 ml

**Dilution Factor** 

1

#### Sample Description/Narrative:

#### 906041304SBIOBLR6 Condensate

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	1	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	06/08/99	
Sample Name:	906071229C	Date Extracted:	06/15/99	
Lab Sample ID:	9906024	Date Acquired:	06/29/99	
MS Data file:	S996024B	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 906071229BIOBLR6 Condensate/d14-Terphenyl out of criteria

Pre Extraction Surrogates	% Recovery			% Recover	y
2-Fluorophenol(surr#1)	58	P	D5-Nitrobenzene(surr#3)	80	P
D5-Phenol(surr#2)	50	P	2-Fluorobiphenyl(surr#4)	80	P
2,4,6-Tribromophenol(surr#5)	105	P	D14-Terphenyl(surr#6)	138	F
Pre Sampling Surrogates	% Recovery			% Recover	ry
13C6-1,2 Dichlorobenzene	NS		13C6-2,5 Dichlorophenol	NS	
13C6-Napthalene	NS		13C6-2,5-Phthalate anhydride	NS	
D10-Anthracene	NS				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

E =exceeded calib ND =not detected

J = Peak below the calibration range

Project:	<b>Orimulsion</b>	Date Sampled:	06/08/99
Sample Name:	906071229C	Date Extracted:	06/15/99
Lab Sample ID:	9906024	Date Acquired:	06/29/99
MS Data file:	\$996024B	Analyst:	Bill Preston
Method:	<b>8270</b>	QC reviewer:	Dennis Tabor
	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

#### Sample Description/Narrative:

906071229BIOBLR6 Condensate/d14-Terphenyl out of criteria

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	ND
2,6-Dinitrotoluene	ND	Anthracene	ND
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	ND
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	ND
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	ND	Benzo(a)anthracene	ND
Diethyl phathalate	ND		

Project: Orimulsion
Sample Name: 906071229C
Lab Sample ID: 9906024
MS Data file: S996024B
Method: 8270

Date Extracted: 06/15/99
Date Acquired: 06/29/99
Analyst: Bill Preston

Date Sampled:

QC reviewer: Extract Volume Dennis Tabor

06/08/99

Dilution Factor

1 ml

1

#### Sample Description/Narrative:

906071229BIOBLR6 Condensate/d14-Terphenyl out of criteria

HRGC/LRMS

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	06/07/99	
Sample Name:	906071229F	Date Extracted:	06/21/99	
Lab Sample ID:	9906022	Date Acquired:	06/30/99	
MS Data file:	\$996022A	Analyst:	Bill Preston	
Method:	<b>8270</b>	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

#### 906071229SBFOBLR6 Filter

Pre Extraction Surrogates	% Recovery			% Recover	·y
2-Fluorophenol(surr#1)	56	P	D5-Nitrobenzene(surr#3)	73	P
D5-Phenol(surr#2)	68	P	2-Fluorobiphenyl(surr#4)	75	P
2,4,6-Tribromophenol(surr#5)	95	P	D14-Terphenyl(surr#6)	118	P
Pre Sampling Surrogates	% Recovery			% Recover	r <b>y</b>
13C6-1,2 Dichlorobenzene	53		13C6-2,5 dichlorophenol	61	
13C6-Napthalene	59		13C6-2,5-Phthalate anhydride	. 21	
D10-Anthracene	69				
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	1	J	Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	1	J	Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	) ND	

E = exceeded calib ND = not detected

J = Peak below the calibration range

Project:	Orimulsion	Date Sampled:	06/07/99
	906071229F	Date Extracted:	06/21/99
Lab Sample ID:		Date Acquired:	06/30/99
MS Data file:	S996022A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
1/10/11/0	HRGC/LRMS	Extract Volume	1 ml
		Dilution Factor	1

## Sample Description/Narrative:

#### 906071229SBFOBLR6 Filter

Compound	μg	Compound	μg	
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND	
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND	
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND	
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND	
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND	
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND	
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND	
1,3 Dinitrobenzene	ND	Phenacetin	ND ·	
2-Nitroaniline	ND	Hexachlorobenzene	ND	
3-Nitroaniline	ND	4-Aminobiphenyl	ND	
Safrole	ND	Dinoseb	ND	
Acenaphthylene	ND	Pentachlorophenol(CCC)	ND	
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND	
Dimethyl phathalate	ND	Phenanthrene	ND	
2,6-Dinitrotoluene	ND	Anthracene	ND	
Acenaphthene(CCC)	ND	Di-n-butyl phthalate	6	J
1-Napthylamine	ND	Isodrin	ND	
2-Napthylamine	ND	Fluoranthene(CCC)	ND	
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND	
2,4-Dinitrophenol(SPCC)	ND	Pyrene	ND	
Dibenzofuran	ND	Chlorobenzilate	ND	
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND	
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND	
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND	
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND	
Fluorene	ND	Benzo(a)anthracene	ND	
Diethyl phathalate	2	J		
* <b>/</b>				

E = exceeded calib ND = not detected J = Peak below

J = Peak below the calibration range NS= not spiked

Date Sampled: 06/07/99 Orimulsion Project: Date Extracted: 06/21/99 Sample Name: 906071229F 06/30/99 Date Acquired: Lab Sample ID: 9906022 Analyst: **Bill Preston** MS Data file: \$996022A QC reviewer: Dennis Tabor 8270 Method:

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

#### Sample Description/Narrative:

906071229SBFOBLR6 Filter

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	34	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	06/07/99	
Sample Name:	906071229X	Date Extracted:	06/21/99	
Lab Sample ID:	9906023	Date Acquired:	06/30/99	
MS Data file:	S996023A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
Monio.	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

## 906071229SBXOBLR6 XAD-d14-Terphenyl out of criteria

2,4,0-1 fibromophenoi out of criteri				01 D	
Pre Extraction Surrogates	% Recovery			% Recover	гу
2-Fluorophenol(surr#1)	72	P	D5-Nitrobenzene(surr#3)	87	P
D5-Phenol(surr#2)	85	P	2-Fluorobiphenyl(surr#4)	91	P
2,4,6-Tribromophenol(surr#5)	144	F	D14-Terphenyl(surr#6)	144	F

Pre Sampling Surrogates	% Recovery		% Recovery
13C6-1,2 Dichlorobenzene	59	13C6-2,5 Dichlorophenol	64
13C6-Napthalene	63	13C6-2,5-Phthalate anhydride	29
D10-Acenanthalene	78		

D10-Accmapatations			
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND	4-Methylphenol	ND
Methyl Methanesulfonate	ND	n-Nitrosodi-n-propylamine	ND
n-Nitrosodiethylamine	ND	Nitrobenzene	ND
Bis (2-chloroethyl) ether	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	5	J Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	2
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	6	J n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

J

E = exceeded calib ND = not detected J = Peak below the calibration range NS = not spiked

## **APPCD Organic Support Laboratory**

## Semi-Volatile Organics Report

Date Sampled: 06/07/99 Orimulsion Project: Date Extracted: 06/21/99 Sample Name: 906071229X Date Acquired: 06/30/99 Lab Sample ID: 9906023 MS Data file: \$996023A Analyst: Bill Preston **Dennis Tabor** 8270 QC reviewer: Method: Extract Volume 1 ml HRGC/LRMS

HRGC/LRMS Extract Volume 1 ml
Dilution Factor 1

#### Sample Description/Narrative:

906071229SBXOBLR6 XAD-d14-Terphenyl out of criteria

μg	Compound	μg
1	J 4-Chlorophenyl phenyl ether	ND
ND	2-Methyl-4,6-dinitrophenol	ND
ND	5-Nitro-o-toluidine	ND
ND	Diphenylamine	ND
ND	Diallate	ND
ND	1,3,5-Trinitrobenzene	ND
ND	- · · ·	ND
ND	Phenacetin	ND
ND	Hexachlorobenzene	ND
ND	4-Aminobiphenyl	ND
ND	Dinoseb	ND
ND	Pentachlorophenol(CCC)	ND
ND	Pentachloronitrobenzene	ND
ND	Phenanthrene	ND
ND	Anthracene	ND
ND	Di-n-butyl phthalate	9
ND	Isodrin	ND
ND	Fluoranthene(CCC)	ND
ND	3,3'-Dimethylbenzidine	ND
ND	Pyrene	ND
ND	Chlorobenzilate	ND
ND	p-Dimethylaminoazobenzene	ND
ND	2-Acetylaminofluorene	ND
ND	Benzyl butyl phthalate	ND
ND	3,3'-Dichlorobenzidine	ND
ND	Benzo(a)anthracene	ND
ND		
		1 J 4-Chlorophenyl phenyl ether ND 2-Methyl-4,6-dinitrophenol ND 5-Nitro-o-toluidine ND Diphenylamine ND Diallate ND 1,3,5-Trinitrobenzene ND 4-Bromophenyl phenyl ether ND Phenacetin ND Hexachlorobenzene ND 4-Aminobiphenyl ND Dinoseb ND Pentachlorophenol(CCC) ND Pentachloronitrobenzene ND Anthracene ND Anthracene ND Di-n-butyl phthalate ND Isodrin ND Fluoranthene(CCC) ND Pyrene ND Chlorobenzilate ND Di-Dimethylaminoazobenzene ND D-Dimethylaminoazobenzene ND Benzyl butyl phthalate ND Benzyl butyl phthalate ND Benzo(a)anthracene

J

## **APPCD Organic Support Laboratory**

### Semi-Volatile Organics Report

Orimulsion Date Sampled: Project: 06/07/99 Sample Name: 906071229X Date Extracted: 06/21/99 Lab Sample ID: Date Acquired: 9906023 06/30/99 S996023A MS Data file: Analyst: **Bill Preston** 8270 QC reviewer: Dennis Tabor Method:

HRGC/LRMS Extract Volume 1 ml

Dilution Factor

1

#### Sample Description/Narrative:

906071229SBXOBLR6 XAD-d14-Terphenyl out of criteria

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	8	J 3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

Project:	Orimulsion	Date Sampled:	NA	
Sample Name:	Matrix Spike	Date Extracted:	06/21/99	
Lab Sample ID:	9906048	Date Acquired:	06/30/99	
MS Data file:	\$996048A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

#### Sample Description/Narrative:

Matrix Spike-100 ug of PAH components only

Pre Extraction Surrogates	% Recovery		% Recovery
2-Fluorophenol(surr#1)	NS	D5-Nitrobenzene(surr#3)	NS
D5-Phenol(surr#2)	NS	2-Fluorobiphenyl(surr#4)	NS
2,4,6-Tribromophenol(surr#5)	NS	D14-Terphenyl(surr#6)	NS
Pre Sampling Surrogates	% Recovery		% Recovery
13C6-1,2 Dichlorobenzene	51	13C6-2,5 Dichlorophenol	57
13C6-Napthalene	59	13C6-2,5-Phthalate anhydride	96
D10-Anthracene	84	·	
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND	4-Methylphenol	ND
Methyl Methanesulfonate	ND	n-Nitrosodi-n-propylamine	ND
n-Nitrosodiethylamine	ND	Nitrobenzene	ND
Bis (2-chloroethyl) ether	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	ND	Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	55
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	ND	n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

Orimulsion Date Sampled: Project: Date Extracted: Sample Name: Matrix Spike Date Acquired: 9906048 Lab Sample ID: S996048A MS Data file: 8270 Method: HRGC/LRMS

Analyst: QC reviewer: **Extract Volume** 

1 ml **Dilution Factor** 1

NA

06/21/99

06/30/99

Bill Preston

**Dennis Tabor** 

#### Sample Description/Narrative:

Matrix Spike-100 ug of PAH components only

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND:	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	62	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	72
2,6-Dinitrotoluene	ND	Anthracene	73
Acenaphthene(CCC)	59	Di-n-butyl phthalate	10
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	75
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	75
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	69	Benzo(a)anthracene	75
Diethyl phathalate	ND		

E = exceeded calib

ND = not detected

J = Peak below the calibration range

Project: Orimulsion Date Sampled: NA Sample Name: Matrix Spike Date Extracted: 06/21/99 9906048 Date Acquired: Lab Sample ID: 06/30/99 S996048A MS Data file: Analyst: Bill Preston 8270 QC reviewer: **Dennis Tabor** Method: HRGC/LRMS Extract Volume 1 ml 1 Dilution Factor

Sample Description/Narrative:

Matrix Spike-100 ug of PAH components only

Compound	μg	Compound	μg
Chrysene	75	Benzo(a)pyrene(CCC)	77
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	72	Indeno(1,2,3-cd)pyrene	73
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	73
Benzo(k)fluoranthene	76	Benzo(ghi)perylene	73

Orimulsion Project: Sample Name:

Matrix Spike Dup

Date Extracted: Date Acquired:

Date Sampled:

NA 06/21/99 06/30/99

Lab Sample ID: MS Data file:

9906049 S996049A

Analyst:

Bill Preston

Method:

8270

QC reviewer:

Dennis Tabor

HRGC/LRMS

Extract Volume

1 ml

1 **Dilution Factor** 

#### Sample Description/Narrative:

Matrix Spike Duplicate-100 ug of PAH components only

Pre Extraction Surrogates	% Recovery		% Recovery
2-Fluorophenol(surr#1)	NS	D5-Nitrobenzene(surr#3)	NS
D5-Phenol(surr#2)	NS	2-Fluorobiphenyl(surr#4)	NS
2,4,6-Tribromophenol(surr#5)	NS	D14-Terphenyl(surr#6)	NS
Pre Sampling Surrogates	% Recovery		% Recovery
13C6-1,2 Dichlorobenzene	47	13C6-2,5 Dichlorophenol	49
13C6-Napthalene	53	13C6-2,5-Phthalate anhydride	89
D10-Anthracene	78	•	
Compound	μg	Compound	μg
n-Nitrosomethylethylamine	ND	4-Methylphenol	ND
Methyl Methanesulfonate	ND	n-Nitrosodi-n-propylamine	ND
n-Nitrosodiethylamine	ND	Nitrobenzene	ND
Bis (2-chloroethyl) ether	ND	1-Nitrosopiperidine	ND
Ethyl methanesulfonate	ND	Isophorone	ND
Aniline	ND	2,4-Dimethylphenol	ND
Phenol(CCC)	ND	Bis(2-chloroethoxy)methane	ND
2-Chlorophenol	ND	2,4-Dichlorophenol(CCC)	ND
1,3-Dichlorobenzene	ND	1,2,4-Trichlorobenzene	ND
1,4-Dichlorobenzene(CCC)	ND	Naphthalene	50
1,2-Dichlorobenzene	ND	2-Nitrophenol(CCC)	ND
Benzyl Alcohol	ND	2,6-Dichlorophenol	ND
Bis(2-chloroisopropyl)ether	ND	Hexachloropropene	ND
2-Methylphenol	ND	4-Chloroaniline	ND
n-Nitrosospyrrolidine	ND	Hexachlorobutadiene(CCC)	ND
Acetophenone	ND	n-Nitrosodi-n-butylamine	ND
Hexachloroethane	ND	4-Chloro-3-methyl-phenol(CCC)	ND

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

# **APPCD Organic Support Laboratory**

# Semi-Volatile Organics Report

Project: Orimulsion
Sample Name: Matrix Spike Dup
Lab Sample ID: 9906049
MS Data file: S996049A

8270 HRGC/LRMS Date Sampled: NA
Date Extracted: 06/21/99
Date Acquired: 06/30/99
Analyst: Bill Preston
QC reviewer: Dennis Tabor

Extract Volume 1 ml
Dilution Factor 1

### Sample Description/Narrative:

Method:

Matrix Spike Duplicate-100 ug of PAH components only

Compound	μg	Compound	μg
2-Methylnaphthalene	ND	4-Chlorophenyl phenyl ether	ND
Isosafrole	ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobenzene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentadiene(SPCC)	ND	Diphenylamine	ND
2,4,6-Trichlorophenol(CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol	ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene	ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene	ND	Phenacetin	ND
2-Nitroaniline	ND	Hexachlorobenzene	ND
3-Nitroaniline	ND	4-Aminobiphenyl	ND
Safrole	ND	Dinoseb	ND
Acenaphthylene	53	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone	ND	Pentachloronitrobenzene	ND
Dimethyl phathalate	ND	Phenanthrene	66
2,6-Dinitrotoluene	ND	Anthracene	67
Acenaphthene(CCC)	. 52	Di-n-butyl phthalate	5
1-Napthylamine	ND	Isodrin	ND
2-Napthylamine	ND	Fluoranthene(CCC)	71
4-Nitroaniline	ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPCC)	ND	Pyrene	69
Dibenzofuran	ND	Chlorobenzilate	ND
Pentachlorobenzene	ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophenol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)	ND	3,3'-Dichlorobenzidine	ND
Fluorene	61	Benzo(a)anthracene	69
Diethyl phathalate	ND		
_			

E = exceeded calib

ND = not detected

J = Peak below the calibration range

NS= not spiked

J

Orimulsion Date Sampled: NA Project: Date Extracted: 06/21/99 Matrix Spike Dup Sample Name: Date Acquired: 06/30/99 9906049 Lab Sample ID: **Bill Preston** S996049A Analyst: MS Data file: **Dennis Tabor** QC reviewer: 8270 Method: 1 ml HRGC/LRMS Extract Volume 1 **Dilution Factor** 

## Sample Description/Narrative:

Matrix Spike Duplicate-100 ug of PAH components only

μg	Compound	μg
69	Benzo(a)pyrene(CCC)	72
ND	3-Methylcholanthrene	ND
67	Indeno(1,2,3-cd)pyrene	67
ND	Dibenz(a,h)anthracene	67
72	Benzo(ghi)perylene	67
	69 ND 67 ND	69 Benzo(a)pyrene(CCC) ND 3-Methylcholanthrene 67 Indeno(1,2,3-cd)pyrene ND Dibenz(a,h)anthracene

Project:	Orimulsion	Date Sampled:	06/21/99	
Sample Name:	Resin Blank	Date Extracted:	06/21/99	
Lab Sample ID:	9906050	Date Acquired:	06/30/99	
MS Data file:	S\$96050A	Analyst:	Bill Preston	
Method:	8270	QC reviewer:	Dennis Tabor	
	HRGC/LRMS	Extract Volume	1	ml
		Dilution Factor	1	

### Sample Description/Narrative:

#### Resin Blank-d14-Terphenyl is out of criteria

E =exceeded calib ND =not detected

Pre Extraction Surrogates	% Recovery			% Recovery	
2-Fluorophenol(surr#1)	67	P	D5-Nitrobenzene(surr#3)	82 F	)
D5-Phenol(surr#2)	83	P	2-Fluorobiphenyl(surr#4)	85 F	)
2,4,6-Tribromophenol(surr#5)	113	P	D14-Terphenyl(surr#6)	154 F	7
Pre Sampling Surrogates	% Recovery	,		% Recovery	
13C6-1,2 Dichlorobenzene	58		13C6-2,5 Dichlorophenol	59	
13C6-Napthalene	61		13C6-2,5-Phthalate anhydride	101	
D10-Acenapthalene	87		•		
Compound	μg		Compound	μg	
n-Nitrosomethylethylamine	ND		4-Methylphenol	ND	
Methyl Methanesulfonate	ND		n-Nitrosodi-n-propylamine	ND	
n-Nitrosodiethylamine	ND		Nitrobenzene	ND	
Bis (2-chloroethyl) ether	ND		1-Nitrosopiperidine	ND	
Ethyl methanesulfonate	ND		Isophorone	ND	
Aniline	ND		2,4-Dimethylphenol	ND	
Phenol(CCC)	ND		Bis(2-chloroethoxy)methane	ND	
2-Chlorophenol	ND		2,4-Dichlorophenol(CCC)	ND	
1,3-Dichlorobenzene	ND		1,2,4-Trichlorobenzene	ND	
1,4-Dichlorobenzene(CCC)	ND		Naphthalene	ND	
1,2-Dichlorobenzene	ND		2-Nitrophenol(CCC)	ND	
Benzyl Alcohol	ND		2,6-Dichlorophenol	ND	
Bis(2-chloroisopropyl)ether	ND		Hexachloropropene	ND	
2-Methylphenol	ND		4-Chloroaniline	ND	
n-Nitrosospyrrolidine	ND		Hexachlorobutadiene(CCC)	ND	
Acetophenone	ND		n-Nitrosodi-n-butylamine	ND	
Hexachloroethane	ND		4-Chloro-3-methyl-phenol(CCC)	ND	

J ≈ Peak below the calibration range

NS= not spiked

Project:	Orimulsion	Date Sampled:	06/21/99
Sample Name:	Resin Blank	Date Extracted:	06/21/99
Lab Sample ID:	9906050	Date Acquired:	06/30/99
MS Data file:	S996050A	Analyst:	Bill Preston
Method:	8270	QC reviewer:	Dennis Tabor
1,100	HRG¢/LRMS	Extract Volume	1 ml
		Dilution Factor	1

# Sample Description/Narrative:

Resin Blank-d14-Terphenyl is out of criteria

Compound		μg	Compound	μg
2-Methylnaphthalene		ND	4-Chlorophenyl phenyl ether	ND
Isosafrole		ND	2-Methyl-4,6-dinitrophenol	ND
1,2,4,5-Tetrachlorobena	ene	ND	5-Nitro-o-toluidine	ND
Hexachlorocyclopentad		ND	Diphenylamine	ND
2,4,6-Trichlorophenol(	CCC)	ND	Diallate	ND
2,4,5-Trichlorophenol		ND	1,3,5-Trinitrobenzene	ND
2-Chloronaphthalene		ND	4-Bromophenyl phenyl ether	ND
1,3 Dinitrobenzene		ND	Phenacetin	ND
2-Nitroaniline		ND	Hexachlorobenzene	ND
3-Nitroaniline		ND	4-Aminobiphenyl	ND
Safrole		ND	Dinoseb	ND
Acenaphthylene		ND	Pentachlorophenol(CCC)	ND
1,4-Naphthoquinone		ND	Pentachloronitrobenzene	ND
Dimethyl phathalate		ND	Phenanthrene	ND
2,6-Dinitrotoluene		ND	Anthracene	ND
Acenaphthene(CCC)		ND	Di-n-butyl phthalate	6
1-Napthylamine		ND	Isodrin	ND
2-Napthylamine		ND	Fluoranthene(CCC)	ND
4-Nitroaniline		ND	3,3'-Dimethylbenzidine	ND
2,4-Dinitrophenol(SPC	C)	ND	Pyrene	ND
Dibenzofuran		ND	Chlorobenzilate	ND
Pentachlorobenzene		ND	p-Dimethylaminoazobenzene	ND
2,4-Dinitrotoluene	***************************************	ND	2-Acetylaminofluorene	ND
2,3,4,6-Tetrachlorophe	nol	ND	Benzyl butyl phthalate	ND
4-Nitrophenol(SPCC)		ND	3,3'-Dichlorobenzidine	ND
Fluorene		ND	Benzo(a)anthracene	ND
Diethyl phathalate		ND		

J

Date Sampled: 06/21/99 Orimulsion Project: Date Extracted: Resin Blank 06/21/99 Sample Name: Date Acquired: 06/30/99 9906050 Lab Sample ID: **Bill Preston** Analyst: S996050A MS Data file: **Dennis Tabor** QC reviewer: 8270 Method:

1 ml Extract Volume HRGC/LRMS 1

Dilution Factor

Sample Description/Narrative:

Resin Blank-d14-Terphenyl is out of criteria

Compound	μg	Compound	μg
Chrysene	ND	Benzo(a)pyrene(CCC)	ND
di-n-Octyl phthalate(CCC)	ND	3-Methylcholanthrene	ND
Benzo(b)fluoranthene	ND	Indeno(1,2,3-cd)pyrene	ND
7,12-Dimethylbenz(a)anthracene	ND	Dibenz(a,h)anthracene	ND
Benzo(k)fluoranthene	ND	Benzo(ghi)perylene	ND

# APPENDIX E Metals Analysis Laboratory Reports



Full Service Analytical & Environmental Solutions

**CASE NARRATIVE** 

Main Office: 449 Springbrook Road P.O. Box 240543 Charlotte, NC 28224-0543

> Phone: 704/529-6364 1/800/529-6364 Fax: 704/525-0409

08/11/99

CLIENT: PROJECT ID: **ARCADIS Geraghty & Miller** 

MATRIX:

AIR

LAB GROUP ID: 8401E24

**Orimulsion** 

NUMBER OF SOURCES:

12

DATE COLLECTED:

05/18-7/1/99 07/2/99

SAMPLE ID:

AB34730 - AB34753

DATE RECEIVED:

#### Sample Disposition:

36 containers were received on 07/2/99 11:00 in the laboratory. The samples were received in good condition.

Cross Reference of Field ID	Prism Laboratory ID
907010942 Train 1 sample 1	AB34730
907010942 Train 1 sample 2	
907010942 Train 1 sample 3	AB34731
907010943 Train 1 sample 1	AB34732
907010943 Train 1 sample 2	
907010943 Train 1 sample 3	AB34733
906031215SMFOBLR6	AB34734
906031215SMNOBLR	
906031215SMIOBLR6	AB34735
906041303SMFOBLR6	AB34736
906031215SMNOBLR	
906031215SMIOBLR6	AB34737
906071228SMFOBLR6	AB34738
906071228SMNOBLR	
906071228SMIOBLR6	AB34739
905171200SMFFBL01	AB34740
905171200SMNFBL01	
905171200SMIFBL01	AB34741
905181131SMFOBL04	AB34742
905181131SMNOBL04	
905181131SMIOBL04	AB34743
905191016SMFOBL04	AB34744
905191016SMNOBL04	
905191016SMIOBL04	AB34745
905211133SMFOBL04	AB34746
905211133SMNOBL04	
905211133SMIOBL04	AB34747

Cross Reference of Field IDs to Laboratory IDs				
Sample Field ID	Prism Laboratory ID			
905241201SMFOBL01 905241201SMNOBL01	AB34748			
905241201SMIOBL01	AB34749			
905251142SMFOBL01 905251142SMNOBL01	AB34750			
905251142SM1OBL01	AB34751			
905261053SMFOBL01 905261053SMNOBL01	AB34752			
905261053SMIOBL01	AB34753			

#### Sample Analysis:

The samples were analyzed using approved USEPA methodology.

The following test method was utilized for the analysis of the samples:

Metals	EPA Method 29	Determination of metals emissions from stationary sources.
Analytes	Test Method	Method Description

#### **Analytical Fraction 1A**

Samples AB34748, AB34750, AB34752, AB34734, AB34736, AB34738, AB34744 and AB34746, were analyzed for nickel at a 1:200 dilution due to the high concentration of nickel.

Samples AB34748, AB34750, AB34752, AB34734, AB34736, AB34738, AB34742, AB34744 and AB34746, were analyzed for vanadium at a 1:200 dilution due to the high concentration of vanadium.

Zinc and antimony recoveries for sample AB34748 were outside specified limits, possible matrix interference suspected.

Zinc recovery for sample AB37736 was outside specified limits, possible matrix interference suspected.

The %RSD and matrix spike recovery for nickel and vanadium on samples AB34748and AB34746 was not calculated because of the high dilution needed.

The reporting limit standard in position 84 exhibited carry over from the previous samples. However, the values of the associated samples were greater than 10 times the reporting limit.

#### Analytical Fraction 2A

The matrix spike recovery for vanadium on sample AB34749 was outside laboratory control limits because the spike true value was less than one fifth the sample concentration.

Nickel and magnesium recoveries for sample AB34747 were outside specified limits, possible matrix interference suspected.

If you have any questions concerning this narrative report, please call (704) 529-6364.

PRISM LABORATORIES, INC.

Turnuth MB Janne

Helmuth M.B. Janssen Quality Assurance Manager



7/29/99

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Mr. Dennis Tabor

Customer Project Name: RN 992010.0024.00001

ARCADIS Geraghty & Miller

Customer Sample ID: 906031215FILTE

2301 Rexwoods Dr. Ste 100

Prism Sample ID: AB34734 Login Group; 8401E24

Raleigh, NC 27607

Sample Collection Date/Time: 6/3/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed			••	7/7/99 08:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHJ
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/8/99 08:00	DHU
ARSENIC BY METHOD 29	5.1	นฏ	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	20	na	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	11	ug	2.0	Mathod 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD (2)	7.0	ug	2.0	Method 29	7/12/99 08:00	CHO
COPPER BY METHOD 29	<b>5</b> 3	ug	2.0	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	18	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	3000	ug	20	Method 29	7/12/99 08:00	ראם
MANGANESE BY METHOD 29	30	ug	2.0	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	210	ug	20	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	780	ug	2.0	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD ::9	29000	ug	400	Melhod 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	6800	ug	400	Method 29	7/12/99 08:00	DHJ

Sample Comments:

RN 992010.0024.00001



7/29/99

Mr. Dennis Tabor

ARCADIS Geraghty & Miller

2301 Rexwoods Dr. Ste 100

Raleigh, NC 27607

Page 6 of 24

Customer Project Name: RN 992010.0024.00001 Customer Sample ID: 906031215

Prism Sample ID: AB34735

Login Group: 8401E24

Sample Collection Date/Time: 6/3/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
SAMPLE PREPARATION FOR METHO	Completed	•		Method 29	7/7/99 08:00	DHJ
ARSENIC BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	pm .
ANTIMONY BY METHOD 20	6.4	ug	1.5	Method 29	7/12/99 08:00	LHQ
BERYLLIUM BY METHOD 28	1.7	ug.	1.5	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	Less then	ug	1.5	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	18	Ug	1.5	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 28	3.8	ug	1.6	Method 28	7/12/99 06:00	ראם
	400	บต	15	Method 29	7/12/99 08:00	LHQ
IRON BY METHOD 29	6.5	na	1.5	Method 29	7/12/99 08:00	CHG
MANGANESE BY METHOD 29	110	ug	15	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHO! 29	630	ug	1.5	Method 29	7/12/99 06:00	DHJ
NICKEL BY METHOD 29			1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 19	3200	ug	1.5	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	150	ug	1.0			

Sample Comments:

RN 992010.0024.00001



7/29/99

Mr. Dennis Tabor

ARCADIS Geraghty & Miller

2301 Rexwoods Dr, Ste 100

Raleigh, NC 27607

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 906041303FILTE

Prism Sample ID: AB34736 Login Group: 8401E24

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Sample Collection Date/Time: 6/4/99

Lab Submittal Date/Time: 7/2/99 11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 08:00	DHJ
SAMPLE PREPARATION FOR METHO	Completed		•	Method 29	7/8/99 06:00	DHJ
ARSENIC BY METHOD 29	9.3	ug	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	32	ug.	2.0	Method 29	7/12/99 08:00	DHI
BERYLLIUM BY METHOD 29	20	ug	2.0	Method 29	7/12/99 D8:00	DHN
CADMIUM BY METHOD 29	9.0	ug	2.0	Method 29	7/12/99 08:00	DHN
COPPER BY METHOD 29	70	ug	2.0	Method 29	7/12/99 08:00	DH1
CHROMIUM BY METHOD 29	30	ug	2.0	Method 29	7/12/99 08:00	DHI
IRON BY METHOD 29	4500	ug	20	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	42	Ug	2.0	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	69	ug	20	Method 29	7/12/99 08:00	DHI
ZINC BY METHOD 29	1000	ug	2.0	Method 29	7/12/99 08:00	DH1
VANADIUM BY METHOD 29	48000	Uģ	400	Method 29	7/12/99 08:00	DH1
NICKEL BY METHOD 29	8800	ug	400	Method 29	7/12/99 08:00	DHJ

Sample Comments:

RN 992010.0024.00001



Full Service Analytical & Environmental Solutions

7/29/99

Mr. Dennis Tabor

ARCADIS Geraghty & Miller

2301 Rexwoods Dr. Ste 100

Raleigh, NC 27607

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 906041303

Prism Sample ID: AB34737

Login Group: 8401E24

Sample Collection Date/Time: 6/4/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
ZINC BY METHOD 29	9.7	ug	1.5	Method 29	7/12/99 08:00	DHJ
	21	Ug	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUI. 3Y METHOD 29	Less than	υg	1.5	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	Less than	ug	15	Method 29	7/12/99 08:00	CHO
MAGNESIUM BY METHOD 29	Loss than	ug	1.5	Method 29	7/28/99 14:47	DHJ
MANGANESE BY METHOD 29	30	_	15	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29		ug	1.5	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	3.0	ug	1.5	Method 29	7/28/99 14:47	DHJ
COPPER BY METHOD 29	3.0	nĝ	1.5	Method 29	7/28/99 14:47	DHJ
CADMIUM BY METHOD 20	3.0	ug		Method 29	7/28/99 14:47	DHJ
BERYLLIUM BY METHOD 29	Less than	ug	1.5	¥	7/28/99 14:47	DHJ
ANTIMONY BY METHOD 29	Less than	ug	1.5	Method 29	7/28/99 14:47	DHJ
ARSENIC BY METHOD 29	Less than	ug	1.5	Method 29		DHJ
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/7/99 08:00	Dilo

Sample Comments:

RN 992010.0024.00001



7/29/99

Mr. Dennis Tabor

ARCADIS Geraghty & Miller 2301 Rexwoods Dr. Ste 100

Raleigh, NC 27607

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 906071228FILTE

Prism Sample ID: AB34738 Login Group: 8401E24

Sample Collection Date/Time: 6/7/99

Leb Submittal Date/Time: 7/2/99 11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
30MB PREP. FOR METHOD 29	Completed				7/7/99 18:00	DHJ
30MB PREP. FOR METHOD 29	Completed				7/7 <b>/9</b> 9 08:00	DHJ
ZINC BY METHOD 29	1000	ug	2.0	Method 29	7/12/99 08:00	DHJ
JANADIUM BY METHOD 29	38000	ug	400	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	7800	ug	400	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	110	ยดู	20	Method 29	7/12/99 08:00	ראם
MANGANESE BY METHOD 29	40	ug	2.0	Method 29	7/12/99 08:00	CHJ
IRON BY METHOD 29	4100	Ug	20	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	23	ug	2.0	Melhod 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	75	ug	2.0	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	9,6	ug	2.0	Method 29	7/12/99 08:00	THO
BERYLLIUM BY METHOD 29	16	ug	2.0	Method 29	7/12/99 08:00	ראם
ANTIMONY BY METHOD 29	30	ug	2.0	Mathod 29	7/12/99 08:00	DHJ
ARSENIC BY METHOD 29	7.6	ug	2.0	Method 29	7/12/99 08:00	DH1
SAMPLE PREPARATION FOR METH	O Completed			Method 29	7/8/99 08:00	DHJ

Sample Comments:

RN 982010.0024.00001



Full Service Analytical & Environmental Solutions

7/29/99

Mr. Dennis Tabor

ARCADIS Geraghty & Millor 2301 Rexwoods Dr. Ste 100

Raleigh, NC 27607

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 906071228 Prism Sample ID: AB34739

Login Group: 8401E24

Sample Collection Date/Time: 6/7/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

					•	
TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
ZINC BY METHOD 29	9.4	ug	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	8.7	ug	1.5	Mathod 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	Less than	ug	15	Method 28	7/12/99 08:00	DHJ
MANGANESE BY METHO() 29	Less than	υg	1.5	Method 29	7/12/99 14:47	DH1
IRON BY METHOD 29	20	บg	15	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	Less than	υg	1.5	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	2.4	Ug	1.5	Method 29	7/12/99 14:47	LHa
CADMIUM BY METHOD 29	Less than	ψg	1.5	Method 29	7/12/99 14:47	DHJ
BERYLLIUM BY METHOD 29	Less than	ug	1.5	Mathod 29	7/12/99 14.47	DHJ
ANTIMONY BY METHOD 29	1.7	ug	1.5	Method 29	7/12/99 14:47	DHJ
ARSENIC BY METHOD 29	Less than	υg	1.5	Method 29	7/12/99 14:47	DHJ
SAMPLE PREPARATION FOR METHO	Completed	٠.		Melhod 29	7/7/99 08:00	DHJ

Sample Comments:

RN 992010.0024.00001



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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905271200FILTE
Prism Sample ID: AB34740

Login Group: 8401E24

Sample Collection Date/Time: 5/27/99

Lab Submittal Date/Time: 7/2/99 11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 08:00	CHO
ZINC BY METHOD 29	7.5	ug	2.0	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	12	ug	2.0	Method 29	7/12/99 08:00	rHa
NICKEL BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	ראם
MAGNESIUM BY METHOD 29	Less than	ng	20	Method 29	7/12/99 08:00	CHJ
MANGANESE BY METHOL) 29	2.0	ug	2.0	Method 29	7/12/99 08:00	CHO
IRON BY METHOD 29	33	ug	20	Method 29	7/12/99 08:00	CHO
CHROMIUM BY METHOD 39	Less than	บอู	2.0	Method 29	7/12/99 08:00	CHO
COPPER BY METHOD 29	2.0	ug	2.0	Method 29	7/12/99 08:00	CHO
CADMIUM BY METHOD 29	6.8	nō	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	Less than	иg	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	DHJ
ARSENIC BY METHOD 29	Less than	ប្ប	2.0	Method 29	7/12/99 08:00	DHJ
SAMPLE PREPARATION FOR METH	ID Completed			Method 29	7/8/99 08:00	DHJ

Sample Comments:

RN 992010.0024.00001



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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905271200 Prism Sample ID: AB34741

Login Group: 8401E24

Sample Collection Date/Time: 5/27/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the Indicated sample which was submitted to this laboratory:

			The second of th			
TEST	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
ZINC BY METHOD 29	14	ug .	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	2.4	υg	1.5	Method 29	7/12/99 08:00	DH1
NICKEL BY METHOD 29	Liess than	ug	1.5	Melhod 29	7/12/99 08:00	DH1
MAGNESIUM BY METHOD 29	23	цġ	15	Method 29	7/12/99 08:00	CHG
MANGANESE BY METHOD 29	1.6	ug	1.5	Method 29	7/12/99 14:47	DHJ
IRON BY METHOD 29	20	ug	15	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	ראם
COPPER BY METHOD 29	7.3	ug	1.5	Method 29	7/12/99 14:47	DHJ
CADMIUM BY METHOD 29	2.0	Ug	1.5	Method 29	7/12/99 14:47	DHJ
BERYLLIUM BY METHOD 29	Less than	. ug	1.5	Method 29	7/12/99 14:47	DHJ
ANTIMONY BY METHOD 29	2.0	นฐ	1.5	Method 29	7/12/99 14:47	DHJ
	Less than	ug	1.5	Method 29	7/12/99 14:47	DHJ
ARSENIC BY METHOD 25 SAMPLE PREPARATION FOR METHO	•	-a ,	- 10	Method 29	7/7/99 08:00	DHJ

Sample Comments:

RN 992010.0024.00001



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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905181131FILTE Prism Sample ID: AB34742

Login Group: 8401E24

Sample Collection Date/Time: 5/18/99

Lab Submittal Date/Time: 7/2/99 11:00

The following analytical results have been obtained for the Indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed			•==-	7/7/99 16:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 08:00	DHJ
ZINC BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 06:00	DH1
VANADIUM BY METHOD 29	<b>5</b> 5000	110	4ΩΩ	Mathod 28	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	13000	ug	400	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOL) 29	2100	ug	20	Method 29	7/12/99 08:00	LHO
MANGANESE BY METHOÙ 29	20	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	43	บอ	20	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	12	ug	2.0	Method 29	7/12/99 DB:00	DHJ
COPPER BY METHOD 29	8.5	ug	2.0	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	8.3	ug	2.0	Method 29	7/12/99 08:00	DHI
BERYLLIUM BY METHOD 29	24	ug	2.0	Method 29	7/12/99 08:00	THO
ANTIMONY BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	DKJ
ARSENIC BY METHOD 29	6.3	пĈ	2.0	Method 29	7/12/99 08:00	DHJ
SAMPLE PREPARATION FOR METH	O Completed			Method 29	7/8/99 08:00	DHJ

Sample Comments:

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Raleigh, NC 27607

2301 Rexwoods Dr. Ste 100

Customer Project Name: RN 992010.0024.00001 Customer Sample ID: 905181131 Prism Sample ID: AB34743

Login Group: 8401E24

Sample Collection Date/Time: 5/18/99 Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

					• • • • • • • • • • • • • • • • • • • •	
TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
SAMPLE PREPARATION FOR MET	HO Completed	•••••		Method 29	7/7/99 08:00	DHJ
ARSENIC BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 14:47	DH1
ANTIMONY BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 14:47	DHJ
BERYLLIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 14:47	DH1
CADMIUM BY METHOD 29	Less then	ug	1.5	Method 29	7/12/99 14:47	OH1
COPPER BY METHOD 29	4.8	ug	1.5	Method 29	7/12/99 14:47	DHJ
CHROMIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DH1
(RON BY METHOD 29	26	บดู	15	Method 29	7/12/99 08:00	CHO
MANGANESE BY METHOD 29	Less than	υg	1.5	Method 29	· 7/12/98 14:47	DHJ
MAGNESIUM BY METHOD 29	Less than	ug	15	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	8.1	nõ	1.5	Method 29	7/12/99 06:00	DHT

Sample Comments:

RN 992010.0024.00001



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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905191016FILTE

Prism Sample ID: AB34744

Login Group: 8401E24

Sample Collection Date/Time: 5/19/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed		•	•	7/7/99 08:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHJ
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/8/99 08:00	DHJ
ARSENIC BY METHOD 29	8.4	ng	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	29	บดู	2.0	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	8.2	ug	2.0	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	17	пĜ	2.0	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	22	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	26	ug	20	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	22	nð	2.0	Mathod 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	4700	บดู	20	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	15000	ug	400	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	67000	ug	400	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	2.0	ug	2.0	Method 29	7/12/99 08:00	DHJ

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905191016

Prism Sample ID: AB34745

Login Group: 8401E24

Sample Collection Date/Time: 6/19/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/7/99 06:00	DHJ
ARSENIC BY METHOD 25	Less than	ug	1.5	Method 29	7/12/99 14:47	DHJ
ANTIMONY BY METHOD 29	2.0	ug	1.5	Melhod 29	7/12/99 14:47	DH1
BERYLLIUM BY METHOD 29	Less than	บดู	1.5	Method 29	7/12/99 14:47	DHJ
CADMIUM BY METHOD 29	ess then	ug	1.5	Method 29	7/12/99 14:47	DHJ
COPPER BY METHOD 29	4.7	υ <u>α</u>	1.5	Method 29	7/12/99 14:47	DHJ
CHROMIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	44	ug	15	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	Less than	υQ	1.5	Method 29	7/12/99 14:47	DHJ
MAGNESIUM BY METHOD 29	220	ua	15	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 20	220	QU	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	1100	ug	1.5	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	7.3	ng	1.5	Method 29	7/12/99 08:00	DHJ

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905211133FILTE

Prism Sample ID: AB34746 Login Group: 8401E24

Sample Collection Date/Time: 5/21/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

					. • •	Bro 40 -
TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed			•	7/7/99 08:00	DH1
BOMB PREP. FOR METHOD 29	Completed				7/7/99 18:00	DHJ
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/8/99 06:00	DHJ
ARSENIC BY METHOD 29	17	บดู	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	31	ug	2.0	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 20	7.9	ug	2.0	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	15	ug	2.0	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	45	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	96	ug	20	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	35	ug	2.0	Method 29	7/12/99 05:00	DHJ
MAGNESIUM BY METHOD 29	4900	ug	20	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	16000	ug	400	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	74000	nĝ	400	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	89	Ug	2.0	Method 29	7/12/99 08:00	DHJ

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905211133

Prism Sample ID: AB34747

Login Group: 8401E24

Sample Collection Date/Time: 5/21/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MOL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/7/99 06:00	DHJ
ARSENIC BY METHOD 29	Less than	UQ	1.5	Method 29	7/12/99 14:47	DHJ
	Less than	ug	1.5	Method 29	7/12/99 14:47	DHJ
ANTIMONY BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 14:47	LHO
BERYLLIUM BY METHOD 29	Less than	บอ	1.5	Method 29	7/12/99 14:47	DHJ
CADMIUM BY METHOD 29	Less than	_	1,5	Method 29	7/12/99 14:47	DHJ
COPPER BY METHOD 29		ug	1.5	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	Less than	ប្ប	1.5	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	27	ug	1.5	Method 29	7/12/99 14:47	DHJ
MANGANESE BY METHOD 29	Less than	ug		Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	Less than	ng	15	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	2.0	ug	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	3.2	ug	1.5	Method 29	7/12/99 08:00	CHO
ZINC BY METHOD 29	19	пÔ	1.5	Wellion 5a	*********	

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905241201FILTE

Prism Sample ID: AB34748

Login Group: 8401E24

Sample Collection Date/Time: 5/24/99

11:00 Lab Submittal Date/Time: 7/2/99

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed				7/7/99 06:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHU
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/8/99 08:00	DHJ
AFJENIC BY METHOD 29	10	ยดู	2.0	Method 29	7/12/99 08:00	DH1
ANTIMONY BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	23	ug	0.01	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	6.8	ug	2.0	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	17	ug	2.0	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	8.2	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	69	ug	20	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	19	ug	2.0	Melhod 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	1500	ug	20	Method 29	7/12/99 08:00	נאם
NICKEL BY METHOD 29	16000	ug	400	Mathod 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	60000	ug	400	Method 29	7/12/99 08:00	DHJ
ZINC BY METHOD 29	Less than	ug	2.0	Method 29	7/12/99 08:00	נאם

Sample Comments:

RN 992010.0024.00001



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Gustomer Project Name: RN 992010.0024.00001

Customer Sample ID: 905241201

Prism Sample ID: AB34749

Login Group: 8401E24

Sample Collection Date/Time: 5/24/99 Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MOL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
SAMPLE PREPARATION FOR METHO	Completed			Method 29	7/7/99 06:00	DHJ
ARSENIC BY METHOD 29	Less than	ua	1.5	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	UQ	1.5	Method 29	7/12/99 08:00	DHJ
BERYLLII IM BY METHOD 29	1.8	ug	1.5	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DНЛ
COPPER BY METHOD 29	4.8	ug	1.5	Method 29	7/12/99 08:00	DHN
CHROMIUM BY METHOD 29	2.4	ug	1.5	Method 29	7/12/99 08:00	DHJ
-	100	ug.	15	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29 MANGANESE BY METHOD 29	2.2	ug	1.5	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOL) 29	3000	ug	15	Method 29	7/12/99 06:00	LHQ
	700	nd A	1.5	Method 29	7/12/99 08:00	LHQ
NICKEL BY METHOD 29	3400	ug	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHOD 29 ZINC BY METHOD 29	11	ug	1.5	Method 29	7/12/99 08:00	DHJ
ZING BY ME INOU 29	•••	-2				

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

11:00

Customer Sample ID: 905251142FILTE

Prism Sample ID: AB34750

Login Group: 8401E24

Sample Collection Date/Time: 5/25/99

Lab Submittal Date/Time: 7/2/99

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TESI	TEST RESULT		 MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
PARAMETER		UNITS	MILA.		7/7/99 16:00	DH1
BOMB PREP. FOR METHOD 29	Completed				7/7/99 08:00	DHI
BOMB PREP. FOR METHOD 29	Completed			Method 29	7/12/99 08:00	DHJ.
ZINC BY METHOD 29	Less than	ug	2.0		7/12/99 08:00	DHJ
VANADIUM BY METHOD 29	62000	ug	400	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	15000	ug	400	Method 29		DHJ
MAGNESIUM BY METHOD 29	2300	ug	20	Method 29	7/12/99 08:00	CHO
MANGANESE BY METHOD 29	20	ug	2.0	Method 29	7/12/99 08:00	
IRON BY METHOD 29	43	ug	20	Method 29	7/12/99 08:00	DH1
CHROMIUM BY METHOD 29	8.9	υQ	2.0	Method 29	7/12/99 08:00	DHJ
•	Less than	υg	2.0	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	7.1	ug	2.0	Method 29	7/12/99 08:00	DH1
CADMIUM BY METHOD 29		_	0.01	Method 29	7/12/99 08:00	DH1
BERYLLIUM BY METHOD 29	23	ug	2.0	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Loss than	ug	2.0	Method 29	7/12/99 08:00	DHJ
ARSENIC BY METHOD 29	6.8	ug	2.0	Method 29	7/8/99 08:00	DHJ
SAMPLE PREPARATION FOR METH	O Completed			Mening 20		

Sample Comments:

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905251142

Prism Sample ID: AB34751

Login Group: 8401E24

2301 Rexwoods Dr. Ste 100 Raleigh, NC 27607

**ARCADIS Geraghty & Miller** 

Sample Collection Date/Time: 5/25/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
ZINC BY METHOD 29	15	υg	1.5	Method 29	7/12/99 08:00	DHJ
VANADIUM BY METHCO 29	14	ug	1.5	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	4.8	ug	1.5	Method 29	7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	27	מט	15	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 28	18	ng	1.5	Method 29	· 7/12/99 08:00	DHJ
IRON BY METHOD 29	42	υg	15	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	3.0	Ug	1.5	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	2.9	ug	1.5	Method 29	7/12/99 06:00	DHJ
CADMIUM BY METHOD 29	4.0	ug	1.5	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	ug	1.5	Method 28	7/12/99 08:00	DHJ
ARSENIC BY METHOD 29	Less than	ug	1.5	Method 29	<b>7/12/99 08:00</b>	DHJ
SAMPLE PREPARATION FOR METHO	Completed	_		Method 29	7/7/99 08:00	DHJ
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Sample Comments:

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M: Dennis Tabor

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905261053FILTE

Prism Sample ID: AB34752

Login Group: 8401E24

Sample Collection Date/Time: 5/26/99

Lab Submittal Date/Time: 7/2/99 11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
BOMB PREP. FOR METHOD 29	Completed	••••	• • •		7/7/99 08:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				7/7/99 16:00	DHJ
ZINC BY METHOD 29	Less than	uġ	2.0	Method 29	7/12/99 08:00	DH1
VANADIUM BY METHOD 29	72000	ug	400	Method 29	7/12/99 08:00	DHJ
NICKEL BY METHOD 29	17000	ug	400	Method 29	·7/12/99 08:00	DHJ
MAGNESIUM BY METHOD 29	1600	ug	20	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	20	ug	2.0	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	78	ug	20	Method 29	7/12/99 08:00	DHJ
CHROMIUM BY METHOD 29	6.3	ug	2.0	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	8.0	ug	2.0	Method 29	7/12/99 08:00	DHJ
CADMIUM BY METHOD 29	8.6	ug	2.0	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	27	ug	0.01	Method 29	7/12/99 08:00	DHJ
ANTIMONY BY METHOD 29	Less than	ug	20	Melhod 28	7/12/89 06:00	DH1
ARSENIC BY METHOD 29	10	ug	2.0	Method 29	7/12/99 06:00	DHJ
SAMPLE PREPARATION FOR MET	THO Completed	••		Method 29	7/8/99 08:00	DH1

Sample Comments:

RN 992010.0024.00001



7/29/99

Mr. Dennis Tabor

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Raleigh, NC 27607

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Customer Project Name: RN 992010.0024.00001

Customer Sample ID: 905261053 Prism Sample ID: AB34753

Login Group: 8401E24

Sample Collection Date/Time: 6/26/99

Lab Submittal Date/Time: 7/2/99

11:00

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
ZINC BY METHOD 29	14	ug	1.5	Method 29	7/12/99 08:00	מאם
	3.4	ug	1.5	Method 29	7/12/99 08:00	DH1
NICKEL BY METHOD 29	1.5	ug	1.5	Method 29	7/12/99 06:00	DHJ
MAGNESIUN JY METHOD 29	20	ug	15	Method 29	7/12/99 08:00	DHJ
MANGANESE BY METHOD 29	Less than	Ug	1.5	Method 29	7/12/99 08:00	DHJ
IRON BY METHOD 29	22	ug	15	Method 28	7/12/99 08:00	DH1
CHROMIUM BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
COPPER BY METHOD 29	7.9	ug	1.5	Method 29	7/12/99 08:00	рни
CADMIUM BY METHOD 29	1.8	ug	1.5	Method 29	7/12/99 08:00	DHJ
BERYLLIUM BY METHOD 29	Less than	ua	1.5	Method 29	7/12/99 08:00	DH1
ANTIMONY BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	<b>DH</b> 1
ARSENIC BY METHOD 29	Less than	ug	1.5	Method 29	7/12/99 08:00	DHJ
SAMPLE PREPARATION FOR METHO		wy.	-	Method 29	7/7/99 06:00	DHJ

Sample Comments:

RN 992010.0024.00001



9/21/99

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Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: FOBLR6#2
Prism Sample ID: AB37197

Login Group: 9151E7

Sample Collection Date/Time: 6/3/99

Lab Submittal Date/Time: 7/29/99 14:30

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
LOSS ON IGNITION	16	%	1		- 8/5/99 08:00	DHJ

Sample Comments:



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Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: COBLR6#1

Prism Sample ID: AB37198

Login Group: 9151E7

Sample Collection Date/Time: 6/3/99

Lab Submittal Date/Time: 7/29/99

14:30

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
LOSS ON IGNITION	59	%	1		8/5/99 08:00	DHJ

Sample Comments:

# Report



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Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: FOBLC4#1

Prism Sample ID: AB37199

Login Group: 9151E7

Sample Collection Date/Time: 5/18/99

Lab Submittal Date/Time: 7/29/99

14:30

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
PARAMETER	REGUL				8/20/99 17:00	DHJ
BOMB PREP. FOR METHOD 29	Completed				•	
ARSENIC BY METHOD 29	16	ug	2.5	Method 29	9/14/99 08:00	DHJ
	3.8	ug	2.5	Method 29	9/14/99 08:00	DHJ
ANTIMONY BY METHOD 29	17	ug	2.5	Method 29	9/14/99 08:00	DH1
BERYLLIUM BY METHOD 29		•	2.5	Method 29	9/14/99 08:00	DHJ
CADMIUM BY METHOD 29	41	ug		Method 29	9/14/99 08:00	DHJ
COPPER BY METHOD 29	<b>3</b> 5	ug	2.5		9/14/99 08:00	DHJ
CHROMIUM BY METHOD 29	130	ug	2.5	Method 29		DHJ
IRON BY METHOD 29	3300	ug	25	Method 29	9/14/99 08:00	
	55	ug	2.5	Method 29	9/14/99 08:00	DHJ
MANGANESE BY METHOD 29		_	25	Method 29	8/14/99 08:00	DHJ
MAGNESIUM BY METHOD 29	8100	ug	2.5	Method 29	9/14/99 08:00	DHJ
NICKEL BY METHOD 29	1600	nā		Method 29	9/14/99 08:00	DHJ
VANADIUM BY METHOD 29	7800	ug	120		9/14/99 08:00	DHJ
ZINC BY METHOD 29	56000	ug	120	Method 29	9/14/88 00:00	

Sample Comments:

# ₃b Report



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9/21/99

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Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: FOBLC4#2 Prism Sample ID: AB37200

Login Group: 9151E7

Sample Collection Date/Time: 5/18/99 Lab Submittal Date/Time: 7/29/99

14:30

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST PARAMETER	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
LOSS ON IGNITION	12	%	1		8/5/99 08:00	DHJ
2000 0111011111						

Sample Comments:

# **b** Report



Full Service Analytical & Environmental Solutions

9/21/99

Mr. Dennis Tabor

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Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: FOBLC1#1 Prism Sample ID: AB37201

Login Group: 9151E7

Sample Collection Date/Time: 5/24/99

Lab Submittal Date/Time: 7/29/99

14:30

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST	TEST	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
PARAMETER	RESULT	Oldino				DHJ
SOMB PREP. FOR METHOD 29	Completed				8/20/99 17:00	
	42	ug	2.5	Method 29	9/14/99 08:00	DHJ
ARSENIC BY METHOD 29		_	2.5	Method 29	9/14/99 08:00	DHJ
ANTIMONY BY METHOD 29	12	ug			9/14/99 08:00	DHJ
BERYLLIUM BY METHOD 29	49	ug	2.5	Method 29	_	
	35	ug	2.5	Method 29	9/14/99 08:00	DH1
CADMIUM BY METHOD 29		•	. 2.5	Method 29	9/14/99 08:00	DHJ
COPPER BY METHOD 29	59	ug		Method 29	9/14/99 08:00	DHJ
CHROMIUM BY METHOD 29	130	ug	2.5		9/14/99 08:00	DHJ
IRON BY METHOD 29	2600	ug	25	Method 29		•
	90	ug	2.5	Method 29	9/14/99 08:00	DHJ
MANGANESE BY METHOD 29		_	25	Method 29	9/14/99 08:00	DHJ
MAGNESIUM BY METHOD 29	15000	ng		Method 29	9/14/99 08:00	DHJ
NICKEL BY METHOD 29	17000	ug	120		•	DHJ
VANADIUM BY METHOD 29	79000	ug	120	Method 29	9/14/99 08:00	
ZINC BY METHOD 29	63000	ug	120	Method 29	9/14/99 08:00	DHJ

Sample Comments:



9/21/99

Mr. Dennis Tabor

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Raleigh, NC 27607

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14:30

Customer Project ID: Orimulsion/RN992010.0024

Customer Sample ID: FOBLC1#2

Prism Sample ID: AB37202

Login Group: 9151E7

Sample Collection Date/Time: 5/24/99

Lab Submittal Date/Time: 7/29/99

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

TEST	TEST RESULT	UNITS	MDL	METHOD REFERENCE	DATE/TIME STARTED	ANALYST
PARAMETER	REGOL	1			0.E.DO 00:00	DHJ
LOSS ON IGNITION	14	%	1		8/5/99 08:00	U130
ECCO CITIESTA						

Sample Comments:

#### APPENDIX F

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### APPENDIX G Additional Ecological Risk Assessment Studies

The original risk assessment by Harwell et al. (1995) was conducted for Bitor as part of their original permit application to the State of Florida, and the document was reviewed by an independent technical panel (chosen by EPA) for this report. The conclusions of that panel were presented in Chapter 8.

Following the original assessment, additional studies were conducted that were not reviewed by the independent panel. The studies for the updated assessment included:

- 1. Additional toxicity data on benthic organisms Several additional benthic species indigenous to Tampa Bay were tested for acute toxicity to Orimulsion and to No. 6 fuel oil.
- 2. Additional toxicity data on the surfactant Additional toxicological tests were conducted to evaluate the potential ecological impacts expected from exposure to the surfactant in Orimulsion 100 in the event of a spill, specifically focused on chronic life-cycle tests for endocrine disruption effects.
- 3. Additional ecorisk assessment on surfactant Based on those new chronic life-cycle tests, a risk assessment was conducted on the ecological effects from the surfactant associated with Orimulsion 100 in the event of a large-scale spill into Tampa Bay.
- 4. Additional ecorisk assessment on shallow water and nursery areas Similarly, based on the new acute toxicity information as well as the previous toxicity data, and using a new set of fate-and-transport calculations, a new comparative ecological risk assessment was conducted that focused on the risks to the shallow water critical habitats and nursery areas of Tampa Bay from Orimulsion 100 and No. 6 fuel oil.
- 5. Additional assessment of risk reductions in Tampa Bay and elsewhere An assessment was conducted to examine the overall ecological risk reductions from fuel spills in Tampa Bay and other estuarine ecosystems within the State of Florida.
- 6. Aquatic toxicity studies were conducted on Orimulsion 400. Comparative studies indicated a similar toxicity of the two formulations.

The results of these studies were incorporated into an updated environmental risk assessment conducted for Bitor. The key conclusions of that assessment are listed below:

- 1. The risks to the shallow water, critical habitats of Tampa Bay were reported as being orders-of-magnitude lower for a major spill of Orimulsion than for a comparable spill of No. 6 fuel oil.
- 2. Exposures to the surfactant of Orimulsion 100 in Tampa Bay were reported as being many orders-of-magnitudes lower than the lowest observed effect level as measured through a partial life-cycle test using a sensitive fish species. It was concluded that a spill of Orimulsion 100 would pose no risk whatsoever for endocrine disruption of biota in Tampa Bay.
- 3. The updated assessment also noted that conversion from No. 6 fuel oil to Orimulsion at the Manatee plant would shift electricity production in the rest of the State of Florida, resulting in significant reduction in the risk of spills of #6 fuel oil in other areas of the State, including at the Biscayne National Park, Canaveral National Seashore, and other protected waters of Florida.
- 4. The toxicity of Orimulsion 400 (the current formulation) is comparable to Orimulsion 100. Further, the reformulation of the surfactant in Orimulsion 400 removes the concern regarding potential endocrine disruption.

These conclusions were cited in a document submitted in response to comments on this report by Bitor America (Harwell and Golder 2000). The document was prepared by the lead author of the initial environmental risk assessment reviewed for this report (Harwell et al. 1995) and by an associate of a technical firm that has conducted work in support of Bitor's permitting efforts in the U.S. The submitted document provides additional detail and data, but has not been independently reviewed and is therefore not included in its entirety as part of this report.

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#### **APPENDIX H**

### Comparative Risk Methodology Synopsis of Harwell et al. (1995)

The NCEA review of the comparative risk assessment conducted by Harwell et al. (1995) included a synopsis of the methodology used in the assessment. The synopsis is presented below.

- Meteorological and tidal conditions during and following the hypothetical spill event were input to a hydrodynamical model, based on actual records for Tampa Bay during January 1991 and August 1991. Hydrodynamical conditions during and following each scenario spill were simulated using the NOS-based 3-D hydrodynamical model. This model provided spatially explicit projections following a hypothetical spill scenario of the current vectors through the Tampa bay system and the area near the mouth of the Bay.
- These output current vectors were input to a transport model to define the current field necessary to simulate the transport of the No. 6 fuel oil and Orimulsion. Also provided as inputs to the Orimulsion model and the SIMAP oil spill model were parameters representing the characteristics of the two fuel types as derived from chemical, physical, and weathering characteristics studies, as well as from values in the literature.
- Transport of the spilled No. 6 fuel oil as an oil slick on the surface of Tampa Bay was simulated using the reparameterized SIMAP model analyses: the oil slick was modeled as a set of "spillets" at variable scales of resolution.
- A post-processing algorithm was developed to generate a map of the movement of the oil slick over the duration of the simulation. The map of the movement of the oil slick was transferred into the GIS facility to produce maps of the Tampa Bay region and the oil slick coverage for each scenario analyzed.
- 5) Interception of the No. 6 fuel oil slick that came into contact with the shoreline was also simulated using the SIMAP model. Scientists developed another algorithm to calculate the amount of mass of oil slick intercepting each section of the shoreline.
- The map of the interception of the oil slick was transferred into the GIS facility to produce maps that superimpose the coastal areas contacted by the No. 6 fuel oil slick overlain onto the coverage of the oil slick for each scenario analyzed.
- The oil slick outputs could not be directly compared with the toxicological exposure-response because there are no data to relate the amount of fuel slick present (or cumulative value for each cell) to ecological effects. Consequently, exposure maps of a No. 6 fuel oil slick are presented with a scalar, using shades of brown to represent the area covered during a simulation by the oil slick. A qualitative examination of the potential effects of the oil slick from a spill of No. 6 fuel oil was developed, considering areal extent of the slick, the area and types of shoreline habitats intercepted by the oil slick, and historical experiences with No. 6 fuel oil spills contacting mangrove and seagrass ecosystems. Note that, since Orimulsion was considered not to develop a significant oil slick, this analysis was not done for Orimulsion scenarios.
- A reformulated and reparameterized SIMAP model was used to simulate the movement of dissolved and particulate fractions entrained into the water column following a spill of No. 6 fuel oil. For each cell in the SIMAP grid for each time step, each non-zero value of aromatic concentration was noted. For each cell, the cumulative exposure (concentration x duration) was calculated, based on the maximum concentration seen at any level within the 5-layer water column during each time step. Units for the cumulative exposures are ppb-hr of dissolved aromatics.

- 9) Transport of spilled Orimulsion was simulated using the Orimulsion spill model. This model simulated the 3-D movement over time throughout Tampa Bay and associated waters of the Orimulsion particulates and dissolved fraction in the water column. The modeled fraction used in the risk characterization was the total hydrocarbon content of the water column.
- 10) The output files from the Orimulsion transport model were sent for post-processing. As for the aromatics in No. 6 fuel oil, the cumulative exposures of Orimulsion at each cell in the grid were calculated. Units for the cumulative exposures are ppm-hr of hydrocarbons.
- As for No. 6 fuel oil aromatics, total Orimulsion hydrocarbons were transferred to the much higher resolution GIS and advanced visualization system for mapping and for calculations of co-occurrence.
- The toxicity studies on the potential effects of No. 6 fuel oil and Orimulsion on mangroves and seagrasses were carefully examined. It was concluded that no ecologically significant habitat alteration to the mangrove or seagrass plant communities of Tampa Bay would result from a spill of either No. 6 fuel oil or Orimulsion. The focus then turned to an examination of water-column effects from the two fuel types and the oil slick effects from No. 6 fuel oil.
- The toxicological information provided by the survey, the INTEVEP project on Orimulsion, and other literature reviews, plus the results of the toxicological experiments conducted on seagrasses, seagrass community invertebrate inhabitants, spotted sea trout early life stages, and mangroves, were examined to identify appropriate toxicological benchmarks for No. 6 fuel oil and Orimulsion. The result was the selection of the spotted sea trout yolksac larvae toxicological responses to represent the sensitive species present in the Tampa Bay ecosystem. This selection represents a conservative but ecologically and societally important choice.
- Data for toxicity tests on spotted sea trout yolksac larvae were analyzed to identify doseresponse and time-dependent exposure-response relationships. It was decided to use the 48hr toxicity test for the oil-water dispersion (OWD) fraction of both Orimulsion and No. 6 fuel oil as most representative of conditions in Tampa Bay following a spill. In part, this decision derived from a detailed look at the frequency distribution of cumulative time of exposures and, in part, this decision related to the leveling off of toxicity at exposure periods exceeding 48 hours.
- A series of steps was developed to convert from dosing to modeled conditions; for No. 6 fuel oil, this entailed calculating from the oil-water dispersed fraction stock solution concentrations and nominal concentrations through BTEX to aromatics concentrations effectively seen by the test organisms; for Orimulsion, it involved going from the concentration of Orimulsion in the dosing conditions to the total hydrocarbons simulated in the Orimulsion transport model.
- These conversion factors were applied to toxicity data to derive lethality rate-modeled fraction exposure relationships. The concentrations were multiplied by 50 to represent the associated exposure of a two-day period (comparable to 48-hr tests).
- Using these normalized exposure data,  $LC_{10}$  and  $LC_{95}$  values for aromatics for No. 6 fuel oil and total hydrocarbons for Orimulsion were calculated using a logistic equation to fit the raw data. The  $LC_{10}$  level was chosen on the assumption that no ecological responses would be ecologically significant at changes <10%. The  $LC_{95}$  level was chosen to represent a reasonable upper bound on the asymptotic logistic equation.
- These LC<sub>10</sub> and LC<sub>95</sub> values were used to provide the scalars for the graphical representation of the exposure levels for each scenario simulation. By making this scaling, the graphical outputs for No. 6 fuel oil and for Orimulsion are directly comparable in terms of effects to the sensitive species. This allows direct, visual comparative analysis of the risks from each

- fuel type for each scenario.
- These simulations were completed for all 96 scenarios, and the resultant suites of graphical outputs were visually inspected to identify patterns with respect to the key scenario factors (location, seasonality, and wind/current conditions).
- Based on these considerations, four individual scenarios were selected as representative of the types of transport and exposure regimes realized for the scenario set for each location. These four selected scenarios were then explored much more thoroughly for detailed ecotoxicological analyses.
- The extensive database was entered into the GIS facility; we have acquired more than 50 separate environmental databases containing all relevant biological, ecological, and physical information from federal, state, and local agencies concerned with management of Tampa Bay. This extensive, unique database provides a unique capability to converge considerable distribution data with well-defined exposure regime projects.
- A series of steps was developed to relate the exposure and co-occurrence data for the spotted sea trout species to population-level effects and recovery times. We conducted similar analyses for inland silversides (i.e., the less sensitive species).
- A series of steps was developed to use the exposure and co-occurrence information to calculate quantitative values for comparing the risks of the two fuels to selected species in Tampa Bay. Three approaches for integrating exposure and effects information into an estimate of risk, derived from the EPA framework for ecological risk assessment, were used; single value comparisons (one-dimensional models of toxicant-organism interaction); joint distribution analysis (comparing distributions associated with estimates of exposure and effects); and population modeling.
- Expert judgment was applied to all sets of the risk assessment analyses to develop the synthesis of the comparative risks to the ecological systems of Tampa Bay from a spill of No. 6 fuel oil and a spill of Orimulsion.

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The report gives results of an evaluation of Orimulsion, a bitumen-inwater emulsion produced in Venezuela, to provide a better understanding of the potential environmental impacts associated with its use as a fuel. Pilot-scale tests were conducted at EPA's Environmental Research Center in Research Triangle Park in North Carolina, to provide data on emissions of air pollutants from the combustion of Orimulsion 100 (the original formulation), Orimulsion 400 (a new formulation introduced in 1998), and No. 6 (residual) fuel oil, commonly used in the U.S. These results, and those of full-scale tests reported in the technical literature, were evaluated to determine the potential air pollutant emissions and the ability of commercially available pollution control technologies to adequately reduce those emissions. Results indicate that carbon monoxide, nitrogen oxide, and particulate matter (PM) emissions are likely to be nearly the same as those from No. 6 fuel oil, that sulfur dioxide emissions can increase if the Orimulsion sulfur content is higher than the fuel it replaces, that the PM generated by Orimulsion 100 and 400 is likely to be smaller in diameter than that generated by No. 6 fuel oil, and that hazardous air pollutants are also likely to be similar to those from No. 6 fuel oil. Conventional control technologies can effectively reduce emissions to very low levels.

17. KEY WORDS AND DOCUMENT ANALYSIS							
a. DESCRIPTORS		LIDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group				
Pollution Bitumens Emulsions Fuels Combustion Residual Oils	Emission Carbon Monoxide Nitrogen Oxides Particles Toxicity	Pollution Control Stationary Sources Orimulsion Particulate	13B 14G 11G 07B 07D 21D 21B 06T				
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